The Builder.

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Haggerston Public Baths.....Mr. A. W. S. Cross, F.R.I.B.A., Architect.

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The Church of Prittlewell.

THE Church of St. Mary, of Prittlewell, is by far the most important building in the Hundred of Rochford, which occupies the south-eastern corner of Essex, and is rightly considered to be one of the finest churches that the county possesses.

There was a church here at the time of the Domesday Survey which was evidently one of some importance in pre-Norman days. The entry pertaining to it is of an unusual character, for it states that "to the church of this manor thirty acres of another estate were added by two men."

The Priory of Prittlewell was founded by Robert of Essex for the residence and support of Cluniac monks in the XIIth century; it is usually said, *temp.* Henry II., but it was more probably first founded in the reign of Henry I. The priory stood a little distance to the north of the parish church, and was quite independent of it. It is necessary to say a few words as to the priory, of which there are practically no remains extant, as the parish church is sometimes assumed to have been that of the Cluniac monks. Contrariwise it would have been quite irregular for them in any shape or form to serve it, although the rectory and great tithes of Prittlewell, in conjunction with those of several other parishes, were conferred on the priory about the time of its foundation. The parish church was served by an episcopally instituted vicar; no monk could have held the vicarage save by special dispensation.

Although Prittlewell Priory had a considerable endowment, which was at its own disposal, it was but a cell of the important priory of Lewes, which was the leading Cluniac house in England. It had no full conventual rights of its own, for the priors of Prittlewell, right down to the days of the Dissolution, were always nominated by the prior of Lewes instead of being elected by their own monks. Prittlewell had to pay a mark of silver to Lewes every recurring feast of St. Pancras as a token of subserviency, but save in this respect and the appointment of prior it seems to have been allowed to administer its own affairs. When the commissioners of the Abbot of Cluni visited Prittlewell in 1276 (the Cluniac houses were visited every three years) there were fifteen monks. The visitors three years later found fourteen monks "living good and regular lives, observing the rule of their order, and properly conducting the Divine offices"; they reported that the prior had just had to rebuild his church, but that the other conventual buildings were in good repair. At a visitation of the next century it was found that the monks numbered twenty-four; their church must have been of considerable size, as there were four daily masses.

The foundation charter of the priory names the parish church of Prittlewell first among a variety of gifts, and states that this grant included everything in land and tithes that was held by the three priests of Prittlewell. These three priests were probably those who served the mother church of Prittlewell, and the two churches of Sutton and Eastwood, which were then parochial chapels.

The church of St. Mary is finely proportioned and consists of chancel with south chapel, nave with south aisle, south porch, and western tower. The interior dimensions of the chancel are 37 ft. by 23 ft. 6 in.; of the Jesus chapel, 24 ft. 10 in. by 19 ft. 3 in., of the nave 98 ft. 10 in. by 23 ft. 6 in.; and of the base of the tower 15 ft. by 14 ft. 6 in. The interior measurement of the porch is 9 ft. 10 in. by 9 ft. 4 in., and the parvise over it 11 ft. 6 in. by 11 ft.

There was a church here of some importance, as has been already remarked, in Saxon times. In the north wall of the chancel, which is a somewhat puzzling and complex structure of differing dates, half of a round-headed archway turned in Roman tiles may be noted. There is a strong presumption that we have here a remnant of the pre-Norman church.

There was evidently a considerable enlargement or rebuilding of the parish church of Prittlewell in the earlier Norman days. This would most likely be accomplished by Richard of Essex at the time when he founded the adjacent Cluniac Priory. It is possible that the work then accomplished consisted in the adding of a large Norman nave to the hitherto small Saxon church, the latter being utilised as a chancel.

Prittlewell Church : View from South-east.

This church underwent a strenuous restoration in 1871, at the hands of Mr. Christian; it was re-opened for service on April 4, 1872. During the progress of the work three round-headed Norman windows were opened on the south side of the nave, which had given light to the church before the south aisle was built.

This aisle was first thrown out early in the XIIIth century, as is shown by the construction of the three pointed arches supported by massive piers at the western end of the nave. The arcade between the nave and south aisle consists of six bays, but the three arches nearest the east end are of undoubted XVth century work, and supported on very light octagonal piers. Above these three arches, and in the corresponding space in the raised north wall of the nave, clearstory lights have been inserted.

The story of this alteration is fairly easy to read. About the time of Edward IV. (1461-1483) the parish authorities, in conjunction, doubtless, with the prior of Prittlewell, resolved on a handsome reconstruction and enlargement of the church. The tower was then built, the south aisle enlarged, a south porch built, and the chancel with the south chapel reconstructed. To give more grace to the interior of the church it was resolved to rebuild the south arcade, particularly as the XIIIth century arches had been pierced through the Norman walling after a somewhat clumsy fashion. But this work was never finished; it began at the east end, and when half done came to an abrupt end, probably through failure in funds. Hence arises the singular contrast between the western and eastern halves of this arcade as it now stands. A particularly handsome piece of work that was then accomplished was the embattling of nave, aisle, chapel and chancel in chequered work of alternate squares of stone and flint.

The windows and buttresses of this church throughout are of late XVth century style, though there are traces on the north side of certain alterations of the XIVth century. The tracery of a three-light pointed window of the nave near its east end is obviously XIVth century work, but it was renewed during the 1871 restoration, and we could not ascertain whether or no it is a reproduction of its predecessor.

It is fortunately possible to date with some precision not only the building of the tower but of the interesting Guild Chapel at the east end of the south aisle. Thomas Warde, by will of 1469, directed Agnes his wife to pay 3s. 4d. towards the building of the south aisle. The word aisle was not infrequently used at this period for what we generally term a chapel, and this was probably a bequest to the extension of this aisle to form the Jesus Chapel. John Hoke, of Prittlewell, desired by his will of 1505 to be buried in "the new Ile of Jhu," and bequeathed to it 40d. There was an old-established guild or fraternity of Jesus in connexion with this parish, possessed of a considerable endowment, and re-established on an improved basis in the time of Edward IV. The Jesus priest acted as assistant priest or curate to the parish, and was also schoolmaster; but school and all were swept away by the legislation of Edward VI. The chantry roll entry, prior to its confiscation, put its annual value at 7*l.* 17s. There were "Two wardens, one master, one priest, and certaine bretherne and sisterne there to finde a priest called Jesus priest for ever by license of King Edwarde the Fowerthe. And one Sir William Rowbothum, clerke, of the age of fifty-two yeres, of honest conversation, and teachithe a scole their, having none other lyvynge, is now incumbent thereoff. The seid priest singithe within the seid churche of Pritwell."

The south porch is of good construction, but sadly overweighted with exuberant ivy, which is already working mischief on the south and east sides. The square-headed windows on each side are bricked up. There is a projecting stair turret in the west angle of the porch to give access to the upper room or parvise; the doorway into it is within the church. The south door within the porch is a fine, well-carved example of XVth century woodwork in excellent condition; it has a good latch-ring, as well as a large closing-ring, often, but quite mistakenly, termed a "sanctuary" ring.

The most striking feature of the church is the exceptionally fine western tower of greystone. It is of four stages,

and is supported by diagonal buttresses of four set-offs, which reach to the top of the third stage. A good and unusual effect is produced by the angles of the uppermost stage above the buttresses being boldly chamfered. The battlements, which are ornamented with a chequer of flint and stone, rise from a slightly corbelled stringcourse. At the angles are octagonal battlemented pinnacles, which are crowned with richly crocketted finials.

There is a good west doorway to the tower, with squared hood-mould and shields in the spandrils; there is no charge left on the south of these shields, that on the north bears a Latin cross. Immediately over the doorway runs a band of chequered work. Above this is a three-light pointed Perpendicular window, the tracery of which has been renewed. On each side of this window, on a level with the spring of the arch, is a small image niche, deeply recessed. There is also a projecting image bracket about 5 ft. from the ground, on each side of the west doorway. On the north and south faces of the tower there is a single deeply-recessed image niche immediately above the centre of the first stringcourse. There are small two-light windows on the four sides of the third stage, though that on the south side is concealed by a clock-face. The bell-chamber windows are of three cinquefoiled main lights under somewhat depressed arches. Any sound student of English architecture would be inclined to date this tower about the middle of the XVth century. Documentary evidence shows that such a surmise is correct. The tower, which was probably a long time in building, was approaching completion in 1469. In that year Thomas Warde, yeoman, of Prittlewell, left by will 6s. 8d. towards the construction of the pinnacles of the tower of the parish church. Another benefactor in the same year left 40s. by will for the like object.

Against the lower stage of the south side of the tower four corbels, that formerly supported a lean-to building of some size, may be noted. From this adjunct there was a doorway into the church at the west end of the south aisle. That this building was a chantry house for the priest of the Jesus Guild is a likely supposition; it was here probably that he held his school.

The tower has for a long time been celebrated for its fine ring of bells. In 1840 it enjoyed an unenviable reputation owing to the fierce disputes, involving the production of pistols and knives, between the vicar (Dr. Nolan) and the ringers, which ended in legal proceedings. In these happier times the ring has been increased from eight to ten bells, in honour of Queen Victoria's jubilee.

The font is one of unusual construction, and of peculiar interest. It is of octagon shape and 2 ft. 7 in. in diameter. Six of the concave sides or panels bear sculptured ornaments. The panel facing east has borne a rood, which is now much defaced; other panels have respectively a Tudor rose, a half rose, a dimidiated rose and pomegranate, a chevron between three fleur-de-lis, and the unusual, if not unique, design, at this date, of a heart with two spears in saltire, which was probably intended as a symbol of the Passion. The coat of arms most likely represents the family of the donor, but it is almost hopeless to attempt its identification without the tinctures, for a chevron between three fleur-de-lis was borne by so many families; perhaps it may be for Fanshawe, who had extensive Essex possessions about this period.

This font is obviously towards the end of the third pointed or Perpendicular period. The cognisance of the conjoined halves of a rose and pomegranate helps, however, to assign a more precise date. This combination of the Tudor rose and the pomegranate of Aragon points to that fateful and irregular marriage, fraught with immeasurable consequences to England, the cause (humanly speaking) of the Reformation and the breach with Rome. On November 14, 1501, Henry VII.'s eldest son Arthur, a lad of fifteen, was married in St. Paul's Cathedral to Catherine, the seventeen-year-old daughter of Ferdinand and Isabella, the sovereigns of Aragon and Castile. Prince Arthur died in April, 1502, and in June, 1503, his widow was betrothed to his brother Henry, then barely twelve years of age. The marriage ceremony did not, however, take place till June, 1509, when Henry VIII. was united to Catherine of Aragon at St. Paul's, and crowned at Westminster Abbey. The date of this font is probably just after the accession of Henry VIII., before he had begun that career which made him, as has been cynically observed, "a professional widower."

On the west side of the pier of the arcade nearest to the tower is a small niche, which may have served as a depository for the chrysmatory, or vessel with the holy oils which were used at baptism.

To the north side of the altar of the Jesus chapel is a large mutilated image niche, that has had a groined canopy and projecting bracket. There can be little or no doubt, judging from analogous cases, that here stood a large figure of Our Lord, with the orb in his left hand, and the right hand raised in blessing.

The monuments of this church, are unusually few. In the north-west angle of the nave is reared up a large early XIIIth century stone grave-cover with chamfered edges, and a cross in relief; it was found during the restoration.

On the north side of the church, near the pulpit, is a boldly lettered mural tablet of alabaster and coloured marble, of curious orthography, which is thus inscribed:—

"Here lieth buried Mary Davies the wife of Richard Davies (the sonne of John Davies the elder of Middleton in the County of Salop Esq.) Esq. of the Body Exterordinary unto his Magisty. Shee was the eldest daughter and heire of Richard Cocke of this parishe Esq., the sonne of John Cocke Esq. by Elizabeth his wiffe, one of the daughters of the Right Honorable Thomas Lord Wentwoth Lord Chamberleyn to King Edward the 6. Shee departed this liffe without issue borne one the 2 day of September Anno 1623."

In a circular frame above is a shield bearing four quarters of Davies impaling quarterly of Cocke. The crest is a boar passant, collared; the pig is somewhat clumsily carved, and by one heraldic note-taker has been turned into a hippopotamus! A grant of arms was made in 1587 to John Cocke, of Prittlewell, grandfather of Mary Davies.

The east window of the Jesus chapel is filled with most valuable and highly interesting stained glass, to which a romantic interest is attached. About the close of the XVIIIth century, during the terrible troubles that afflicted France, an Englishman purchased the coloured glass of the south-west window of the noble church of St. Ouen, Rouen, to save it from destruction. This glass, carefully packed away in cases, remained in a cellar near Colchester almost forgotten for about seventy years, in the possession of the Neave family. Soon after the incumbency of the present vicar began (Rev. T. O. Reay, 1880), to whose assiduous care the present good condition of this fabric is so much indebted, this foreign glass was placed by Lady Neave in this window to the memory of Sir Arundell Neave, Bart., who died in 1877. Glass experts put the date of this series of glass pictures, twelve in number, between 1500 and 1540. Some of the designs are exact reproductions of the drawings of Albert Durer. They all illustrate scenes from the Old and New Testaments. The latest, which does not harmonise with the rest, is the Blessed Virgin and Child in a handsome Renaissance border. The most striking of the Old Testament scenes is the death-bed of David, with the crowning of Solomon on a smaller scale in the background. The picture of "Behold the Lamb of God," on the banks of the Jordan, is a fine composition and beautiful in detail. It is somewhat curious that this excellent and interesting glass escaped notice by Mr. Lewis Day in his recent work on "Stained Glass."

In this chapel there is a handsome large panel of Jacobean carving which forms the front of a case for altar frontals, but it has no ancient connection with the church, having been purchased and put to its present use by the vicar.

In the churchyard are a large number of window mullions and other moulded stones discarded during the too vigorous restoration of 1871-2.

INVENTIONS AND THEIR NOVELTY.

THE Patents Act of 1902 embodied two highly important amendments of the Patent Law, the one relating to compulsory licences and the other to the examination of the novelty of inventions on applications for patents. The first amendment relating to compulsory licences has already come into operation, while the second amendment relating to the examination of the novelty of inventions is, by an order of the Board of Trade just published, to come into operation on January 1 next. On and after that date all applications for patents upon which complete specifications have been filed will be subjected to an examination for the purpose of ascertaining whether the invention claimed has been wholly or in part claimed or described in any specification of an English patent published within fifty years next before the date of the application. The expert examining staff has been largely increased in view of the additional work thus rendered

necessary; the new procedure will affect all applications for patents that reach the "complete specification" stage, and each specification will be examined for the purpose of ascertaining whether the invention has been either wholly or in part described or claimed in any previous specification, other than a provisional specification not followed up with a complete specification, published in this country during the fifty years next preceding the date of the application. The official search will be conducted amongst the classified specifications and abridgments which have been prepared to cover the period beginning in 1855. In the spring of last year the Comptroller-General visited Berlin to see the methods adopted in Germany for pursuing inquiries into novelty, and he also caused himself to be informed of the system which has been adopted by the Patent Office of the United States.

This amendment of the law cannot fail to have a substantially beneficial effect. Until now, the examination at the Patent Office has been strictly confined to formalities, and it has always been open to an inventor to make any claims he might choose, without regard to their novelty; so that thus it has always been a matter of some difficulty to determine exactly what an inventor was justly and properly entitled to. By the institution of an examination as to novelty of an inventor's claims, this anomaly will be largely remedied, and it will only now be possible for an inventor to make such claims as are justified in view of the state of the art at the time he files his application. The result of such an examination would obviously be no guarantee as to the novelty of an inventor's claims, for the examination prescribed is strictly confined to the English Patent records. Any anticipations of an invention that may have been previously published in scientific and technical papers, or in the records of scientific and technical societies, will not come into question. Neither will any anticipations contained in the specifications of prior foreign patents published in this country before the date of an application here. So that thus the grant of a patent under the new conditions will hardly be a conclusive guarantee of the novelty of the invention or of the validity of the patent granted; and, in point of fact, this is specially provided for in sub-section 9 of section 1 of the new Act, which prescribes that the examination shall not be held in any way to guarantee the validity of any patent, and that no liability shall be incurred by the Board of Trade in connexion therewith. But still an examination, restricted as it will be to the English Patent Records, will be of considerable public advantage, for it will certainly render impossible the protection or the re-patenting of old inventions; and, having regard to the fact that the English Patent Records are fairly representative of the progress of the manufacturing arts, the result of the search may be taken as *primâ facie* evidence of the novelty of the claims that are allowed having regard to it.

Although the examination prescribed under the new law is thus not thorough and conclusive, yet it undoubtedly will, to a very large extent, effectively serve the purpose of preventing flagrant impositions upon the public in the exploitation of old inventions. In accomplishing this purpose, the procedure provided by the new Act will be particularly useful, inasmuch as the Comptroller of Patents will have power to order in the complete specification filed on an application for patent a reference to the specifications of any prior English patents that describe or claim any part of the invention claimed by the applicant; so that thus a notice will be given to the public in the applicant's own specification as to the limits of his invention, having regard to the prior English patents. The Act, however, provides that the applicant may amend his specification to avoid the prior patents that may be cited in anticipation of his claims, and the power to order a reference to the prior patents is only enforced in event of the failure of the applicant to properly amend his specification and claims having regard to them; so that thus no hardship is ordinarily likely to result in the insertion of these compulsory references.

It is to be observed that under the new law no examination as to novelty will be conducted on a mere application for provisional protection, but the period of nine months' provisional protection hitherto granted will, on and after January 1 next, be reduced to six months, in order to permit of the examinations being completed for the applications to be accepted within the statutory period of twelve months from the date of the application, according to the existing law.

The present proposals, it must be admitted, do not compare favourably with the examinations as to novelty of inventions adopted in other important countries of the world, such as the United States and Germany. In both these countries, for example, the examination extends to all the published Patent Records of all countries, and to all available information published in the text-books, periodicals, and transaction of scientific and technical societies in all the principal countries of the world. It is, however, doubtless impracticable, even if it were advisable, at once to establish in England a more extensive examination approximating to that in vogue in the countries mentioned; but the restricted examination now prescribed is a reform that can easily be developed step by step until it is practicable for the Patent Office to conduct a rigorous and exhaustive examination in regard to the novelty of all inventions submitted for protection; so that thus reliable testimony may be afforded, by the grant of a patent, that the novelty of the invention has been proved.

GUILDHALL, DEVONPORT.—Repairs and redecorating, and some structural alterations, are to be carried out at the old Guildhall at Devonport, which has been for some time in a rather dilapidated condition. The interior and exterior are to be painted, old paintings taken down and cleaned and the frames regilt, and some alterations are to be made in the jury boxes in order to render the court-room more commodious. The work will be carried out by Messrs. R. W. Pitcher and Sons, at a cost of 428*l.*, under the supervision of Mr. J. F. Burns, the Borough Surveyor.

NOTES.

Hampstead Heath. IT is very gratifying to find that the money has been collected to enable the Hampstead Heath Extension Committee to purchase the 80 acres of Wylde's Farm, near the intended station of the Tube railway, so as to prevent this portion of the Heath from becoming, as it undoubtedly would have become, a collection of streets and small houses in the vicinity of the railway station. The collection of the money in time to secure the purchase has, however, only been brought about through the trustfulness and generosity of various persons of means who have guaranteed, in sums of from 50*l.* to 500*l.*, the amount of the 4,000*l.* necessary to make up the purchase-money. Londoners ought to feel greatly indebted to those who have thus come forward to save the scheme when no time was left for further collection from the general public; but it should be remembered that they expect to be, and ought to be, repaid, and that therefore it is still the duty of those who enjoy Hampstead Heath to give their aid, as each one can afford, towards wiping out a debt to those who have trusted in the public to repay them. The land purchased is eventually to be transferred in perpetuity to the London County Council.

Coast Erosion at the Isle of Wight. CONTINUING the work which ages ago cut off the Isle of Wight from the mainland, the sea now threatens to separate the north-west corner of the island by forming a channel from Freshwater Bay to the valley of the River Yar, which enters the Solent at Yarmouth. Although the cliffs between Freshwater Bay and the Needles rise to a height of nearly 500 ft., the bay itself lies in a dip of the coast line. Years ago the adjoining land was protected by a concrete sea-wall, but a large portion of this was destroyed during heavy weather in February, 1899. No attempt has been made to restore this wall, and, as a natural consequence, a considerable fall of cliff has taken place, a road has been washed away, and, as stated above, the sea now threatens to break through to the Yar valley. From a recent Local Government Board Report, it appears that the position is one of some gravity, and that, unless prompt measures be taken, Totland and Freshwater may soon be cut off from the rest of the island. No doubt exists as to the nature of the remedy for the present state of affairs, the only trouble is that the local authorities are unwilling to incur the expense of protecting the lands under their jurisdiction, and suggest that the burden should be laid entirely on the inhabitants of Freshwater. The Local Government Board, in forwarding their report, tried to smooth away difficulties by suggesting that a contribution might be obtained from the Hampshire County Council. How long the local authorities may continue to bargain no one can predict, but one thing seems to be certain—that, unless haggling soon gives place to action, a good slice of the rate-paying area will be eaten up, and serious damage will be done to the new sewage works, on which thousands of pounds are being spent.

Old Defensive Works on the Lea.

NOTWITHSTANDING the sadly-changed aspect of its lower reaches, the River Lea still maintains its popularity as a pleasure resort among the inhabitants of East Middlesex, Essex, and Hertfordshire. In early times the river was of far greater importance, for old writers tell us that it was once navigable by ships as far as Hertford. Lambarde says:—"It hath of long tyme borne vessels twenty myles towards the head, for, in the tyme of King Alfrede, the Danes entered Leymouth, whence King Alfrede espied that the channell of the ryver might be in such sorte weakened that they should want water to returne. He caused, therefore, the water to be abated by two greate trenches, and setting the Londonners upon them, he made their batteil, wherein they lost four of their capitaines." These Danes had doubtless taken their ships to the fort constructed by them on the present site of Ware, and protected by the "weare," which gave its name to the town. By the exploit of King Alfred, the waters were diverted and the Danish ships left high and dry. In more recent times, the Lea has played a part in connexion with the defences of London, for in *The Times* of September 5, 1804—a time when Napoleon was preparing for the invasion of England—it is recorded that Rennie, acting under instructions from the Duke of York, constructed a singular floating-gate at the Four Mills, Bromley, for the purpose of "sustaining the water above the level of high water," apparently with the object of placing an obstacle in the way of an invading army. The "gate" consisted of a vessel which could be sunk, by means of a valve in her bottom, so as to fit a groove formed against the bottom of the river. On its completion this defensive work was inspected by the Duke of York, Mr. Pitt, and several well-known military officers, who afterwards rode up the Lea, to observe the effect produced, as far as the "fishing house"—probably the White Hart at Temple Mills, a house still frequented by anglers in the East-End. As reference is made to the "co-operating sluices at Stratford, and Westham Bridges, the Temple Mills, and Lea Bridge," it is clear that the floating-gate influenced the various natural channels of the Lea across the Marshes, and not the Navigation Cut, constructed about 1772, which gives direct communication from Lea Bridge to Limehouse. In the present day our ideas upon the subject of defensive works differ as much from those of a hundred years ago as from those of the time when good King Alfred reigned in the land.

International Gas Exhibition.

MORE than twenty years have elapsed since an exhibition fully representative of the gas industry in all its branches has been held, and so many changes and developments have since taken place in the methods of using gas for lighting, heating, cooking, and power purposes that the Institution of Gas Engineers, co-operating with the leaders of the gas industry on the Continent and in America, has decided to open an International Gas Exhibition at Earl's Court, London, in November next. The exhibition is to remain open from November 19 until December 17, and is to serve as an object-lesson for the general public as well as for architects, municipal engineers, and surveyors. The best methods of using gas for street-lighting, for lighting public halls, shops, and private dwellings, and for heating and cooking will be shown. It is also intended that the exhibits shall include models of artisans' dwellings supplied with gas by the prepayment system, and models of apartments used by professional men, merchants, shopkeepers, and private householders, suitably fitted with gas-consuming appliances. Arrangements will be made for the delivery of cooking lectures, with practical demonstrations, as well as for scientific and popular lectures, and prizes are to be offered for artistic gas fittings. The exhibition will be registered under the Patent Acts, for the encouragement of inventors, who will be invited to exhibit models and drawings of their inventions. It is proposed to divide the exhibits into the following seven groups:—(1) Lighting. This group will include all kinds of burners, brackets, and lanterns for all descriptions of lighting; (2) cooking and heating; (3) motive power, showing gas applied for pumping, ventilating, printing, driving dynamos, etc.; (4) gas applied to industrial purposes, showing appliances for traction, japanning, lacquering, enamelling, brazing, etc.; (5) science in relation to the gas industry—exhibits to include photometers, calorimeters, pyrometers, leakage detectors, etc.; (6) residual products; (7) engineering in connexion with gas manufacture, distribution, and measurement. The Advisory Committee is remarkably well constituted for the task it has to perform, and we have little doubt that the exhibition will be a success, but we would suggest that when adjudging the competitions for "artistic" fittings the judges appointed should be men who command respect as artists.

A Point in a Building Contract.

IN the case of Robins *v.* Goddard Mr. Justice Farwell had to consider the rights of parties under a building contract which was in the form sanctioned by the Institute of Architects. The architect had given his certificates as the work progressed, and the contractor was suing the building owner on those certificates, which embraced the whole of the work, including extras. The defendant admitted the amount due under those certificates, but counterclaimed against the contractor for defective work and materials, and relied upon a clause in the contract which provides that "No certificate of the architect shall be considered conclusive evidence as to the sufficiency of any work or materials, nor shall it relieve the contractor from his liability to make good all defects as provided by this contract." The construction the Court put upon this clause was that it operated to prevent the certificates given by the architect during the progress of the work from being set up against the powers conferred upon the architect by the contract (clause 17) to order certain defects to be made good within a specified time of the completion of the works; but it was of no use as a defence to this action, since the architect had given no direction as to any defects after the completion of the contract, nor made any order by whom the cost of making them good should be borne; and in consequence the action appeared to be almost an undefended one.

Standardising Copper Conductors.

WE have received from the Engineering Standards Committee an interim report containing "British Standard Tables of Copper Conductors and Thicknesses of Dielectric." We are informed that the tables published in this report are in their final form. We think that some of the ten resolutions arrived at could have been expressed more clearly, and a few more resolutions might have been added in order to explain the subsequent tables. For example, no definition is given of what is meant by the "lay" of a wire; and thus resolution 9, which states that "a lay, involving an increase of 2 per cent. in each wire, except the centre wire," really means something very different from what we imagine the Committee had in their minds. We also wonder, seeing that "lay" is mentioned, why "spiral" is not also mentioned. The latter is all-important in connexion with three-core cables. On p. 10 it is mentioned that the standard armouring for cables above 2 in. in diameter is to be "two layers of compounded steel tape," each 60 mils in thickness. The weight of this armouring will be many tons per mile, and as the iron surrounding two and three core cables is magnetised by the currents in the cores the eddy current and hysteresis losses will be large. Galvanised iron wires would form a far more suitable armouring, and we were glad to note recently that this armouring is being largely adopted in connexion with the mains for the new underground railways in London. The test pressures in this report are specified in a very unscientific manner. On p. 10 we read that "all test pressures may be applied either with alternating or direct current, the former to be at the standard frequency." We thought that it was well known that all insulating materials withstand much higher direct pressures than alternating pressures. The "Compagnie de l'Industrie Electrique et Mécanique" of Switzerland have recently published an exhaustive series of tests which prove conclusively that a material which will withstand a direct-current pressure of 24,000 volts will break down with 15,000 volts alternating. This is in entire agreement with our experience. In conclusion, we note that the Standards Committee have divided cables into "large sizes," "intermediate sizes," and "small sizes," and that, for example, a cable containing thirty-seven strands of wire, the gauge of which is apparently No. 14, may have a cross-sectional area of 0·2 or 0·18 of a square inch, depending on whether it is a "large" size or an "intermediate" size. No hint is given as to how the cross-sectional area will vary with the "spiral" of the core of a cable.

Tramway Poles.

IN the form of an "Interim Report" the Engineering Standards Committee have issued a final specification for tubular

tramway poles, the settlement of which has been attended with more difficulty than was at first anticipated. It appears that the draft specification prepared by the Committee failed to meet with the approval of the makers, and that the various points of difference were not settled until they had been thoroughly discussed at a conference held at the Institution of Civil Engineers in June last. The standard specification provides for three classes of pole—light, medium, and heavy—and for two methods of construction, the overall length for all poles being fixed at 31 ft. One method is to make the poles in three lengths, or sections, either of solid drawn or of lap-welded steel tube, the diameters being such that the sections can be connected by telescopic joints, swaged together when hot. The other method is to make the poles of steel plate, rolled in one length and butt-welded the entire length. Outside diameters are specified for the three classes of pole in each of the two types, and the minimum thickness of metal is fixed at ¼ in. Drop and bending tests of simple but sufficiently severe character are prescribed for application to 5 per cent. of the poles supplied, and if one pole should fail to pass the tests a further 5 per cent. is to be examined, and the failure of one other pole will render the whole delivery liable to rejection. The specification seems to be particularly simple, but it should be observed that the selection of a pole suitable for any given duty is left entirely to the discretion of the responsible engineer.

The Motor Dust Problem.

WRITING to *The Times* on August 31, a correspondent suggests that, in the interests of ratepayers who now "see their money literally blown, scraped, and shovelled away," the dust nuisance should be dealt with at its source, by the adoption of materials such as are used on the Nottingham and Grantham main road. The materials in question really form a special type of tar macadam, which we mentioned in our "Note" of August 27, as capable of affording relief from the dust nuisance. Mr. E. P. Hooley, the County Surveyor of Nottingham, is responsible for "the grand stretches of dustless, mudless roads" cited by the writer of the letter to our contemporary, and it may interest our readers to hear that tar macadam has been used throughout the highways of Scarborough for many years, and by various towns in the Midlands. The Glasgow Corporation have also adopted the same material in place of cobble paving and ordinary macadam. Unfortunately, very little has been attempted in the South of England in the way of reform, but there are at last some evidences of awakened interest in this direction. The Croydon District Council have recently laid two short lengths of Hooley's patent tar macadam—one opposite the Vestry Hall, Mitcham, and the other near Hackbridge Station. We have inspected the former of these examples during dry weather, and also immediately after the heavy rains of last week, and find the surface to be absolutely dustless and mudless. Further, we may refer to the highly satisfactory results following the application of gas tar to a portion of the Reigate-road, close to Banstead Downs. While riding along this stretch a few days ago, we were passed by a motor-car which failed to raise the slightest trace of dust, although when entering upon the ordinary macadam beyond, the same car was immediately lost to sight in a dense cloud of dust. As we said before, there is no difficulty in stopping the dust nuisance; the fear of increased expenditure is the only deterrent. In this connexion, we may mention that Mr. Cooper, the Engineer to the Wimbledon District Council, states the cost of ordinary macadam in that district to be 9·15d. per yd. super, exclusive of watering and scavenging; while, on the basis of an estimate recently received by him, the comparative cost of tar macadam would be 10·5d. per sq. yd. He adds that there would be considerable saving both in watering and in scavenging. Hence we may fairly conclude that very little additional expenditure would be incurred in the long run by the adoption of the improved method of construction.

The Basingstoke Canal, Hants and Surrey.

THIS undertaking will be offered for sale by auction in the course of next month. The canal, which, whilst lately repaired, has been but little used for navigation purposes during many years past, was first projected in 1772, when it was proposed to make a canal from Basingstoke to a junction with an intended canal from Reading to Bray on the Thames. That scheme having come to naught, a body of thirty-three subscribers, under the style of the "Company of Proprietors of the Basingstoke Canal Navigation," obtained in 1778 an Act (18 Geo. III., c. 75) to raise 126,000*l.* for the construction of a canal thirty-seven miles long to the river Wey. In 1793 they obtained a further Act (33 Geo. III., c. 16) for raising additional capital of 60,000*l.*, having spent most of their resources upon the tunnel through Grewell Hill. The navigation was opened in 1796 for vessels limited to a beam of 13 ft. and a length of 72 ft., with a minimum burden of 15 tons. Beginning from the river Loddon near Basing village, the canal takes a level and winding course of twenty-two miles through Hampshire, passing Old Basing and Nateley, and in a tunnel nearly three-quarters of a mile long, cut through the chalk of Grewell Hill, whence, as well as from the Loddon, was obtained the principal supply of water for lockage, etc., and so to the river Deepford, passing by Odiham and Winchfield, skirting Dogmersfield Park, and thence by a long aqueduct across the valley to Crookham and Aldershot, where is the reservoir. That length of twenty-two miles had a top-level 38 ft. wide, and was 5½ ft. deep. Crossing the Blackwater river, which separates the two counties, at a point near Ash in Surrey, the canal bends northwards by Romping Down to Frimley, whence it turns eastwards to Pirbright, Horsell, and its junction with the Wey at a point between Weybridge and Byfleet. The latter portion, through Surrey, of which the course is now closely followed by the main line of the L. and S.W. Railway, is fifteen miles in length, and has twenty-nine equal locks, with a total fall of 195 ft. between the Blackwater and the Wey. A side branch, six miles long, and level, was made across Hook Common northwards to Turgis Green near Strathfieldsaye.

Standards of Fire Resistance.

THE British Fire Prevention Committee send us a pamphlet (No. 82 of their publications) containing—in English, French, and German—a tabular statement of what they consider ought to be the standard of capacity to resist fire in (1) floors and ceilings, (2) partitions, and (3) doors. Each of these types of structure is again classified under three headings, including respectively structures calculated to afford "temporary protection," "partial protection," and "full protection." In the text it is explained that "temporary protection" implies resistance against a fierce fire for at least three-quarters of an hour; "partial protection," resistance for at least an hour and a half; and "full protection," resistance for at least two hours and a half. The tables do not attempt to define the details of the structures which should satisfy these conditions—that would, indeed, hardly be possible, as new methods are being so constantly introduced; they give only the duration and the kind of test which floors, partitions, etc., ought to pass in order to come under any one of the three heads. The pamphlet is accompanied by a letter, signed by the Chairman and General Secretary, calling our attention to the mis-use of the word "fire-proof," and "respectfully suggesting" whether it would be practicable to adopt instead the word "fire resisting." To this we may be excused if we reply in the schoolboy phrase—"Don't teach your grandmother." This view was laid down strongly in our columns, and the expression "fire-resisting" definitely adopted in place of "fire-proof," years before the British Fire Prevention Committee was ever heard of; and to have the advice solemnly offered to us at this time of day is rather amusing.

An Unsatisfactory Competition.

AN advertisement has been sent to us, which has appeared in a Newcastle paper, in which the Benwell and Fenham District Council ask for competitive designs for a Public Library to cost 4,000*l.*, offering premiums of 70*l.*, 40*l.*, and 25*l.*, with the simple announcement "the successful plans to become the property of the Council." Nothing is said of an assessor, and an architect who wrote to ask whether one would be appointed got no reply. The premiums are liberal in proportion to the proposed expenditure on the building; but in every other respect this seems a competition to be avoided by judicious people.

CLUB PREMISES, LEMINGTON, NORTHUMBERLAND.—The new premises of the Lemington and District Club and Institute, Ltd., were opened on the 3rd inst. The building is of stone at the east and north sides, and of brick at the west and south, and the scheme will cost nearly 5,000*l.* The contractor was Mr. Harry Maughan, of Lemington, the designs having been prepared by Mr. William Maughan, of Hexham.

MAGAZINES AND REVIEWS.

THE *Art Journal* devotes an article to two painters of more promise than performance, Smetham and Allston Collins, both belonging to the early half of the last century; the latter a son of Collins the Academician, that painter of quiet and luminous coast scenes. Allston Collins was the original of the figure of the Huguenot in Millais' picture. Both Smetham and Collins were more or less associated with the pre-Raphaelite movement, or at least numbered some of their closest artistic friends among the brotherhood.

Smetham had some points of resemblance with Blake, of whom he was a great admirer. Both were painters whose aspirations seem to have been greater than their powers of realising them; indeed Collins "abandoned painting in despair" in his thirtieth year. His picture of "The Novice," which forms the frontispiece to the *Art Journal*, is however a fine and impressive work, as far as one can judge of it in black and white; a nun looking into a pond covered with water-lilies, with a very intricate and elaborate background of flowers and a hedge, on which patient execution of the pre-Raphaelite type seems to have been expended. Among the designs by Smetham which accompany the article, that of "The Enchanted Princess" almost unquestionably influenced the composition of Millais' "Ophelia." The two artists were well worthy of a kindly notice to keep their memory green. Mr. Cecil Smith, the new keeper of Greek and Roman antiquities at the British Museum, contributes an article on the interesting and rather novel subject, "Sunrise on Greek Vase-Paintings"; not of course realistic representations, but symbolical designs.

The *Burlington Magazine* contains an article on the house and collection of Mr. Edgar Speyer, in Grosvenor-street, which seems to include a most remarkable assemblage of pictures and works of decorative art. Among the illustrations is that of the splendid sideboard in the dining-room, a partially modern one on XVIth century lines, with two original Renaissance figures of boys worked in as part of the construction, and a small marble fountain basin of the same period, on a slender stem, placed in a niche in the centre. On this is a bronze group of a nude child with a swan, executed by M. Mercié for this position, and having itself all the air of a piece of Renaissance work. "Notes on the decorative value of Famille Verte (Chinese) porcelain," by Sir W. Bennett, is accompanied by full-page illustrations of two magnificent vases of this ware, one of which forms the frontispiece, and which leave one in no doubt as to their decorative "value." We agree with the writer in thinking that metal mounts on such vases add nothing to their decorative effect, and in fact, whether original or not (which seems often to be a doubtful point), clash somewhat with the character proper to porcelain. Mr. Lionel Cust and Professor Dobschütz, in No. III. of "Notes on Pictures in the Royal Collection," treat the subject of the portrait of Christ, one of a series of sacred pictures acquired by Prince Albert, and probably painted, we are told, by a Greek priest at Venice, about 1640. The point of the article is as to the resemblance between this and the earlier supposed portrait of Christ preserved in the chapel of the convent of San Bartolommeo degli Armeni at Genoa, now inaccessible, and only known through a copy of it made by Thomas Heaphy, and now in the British Museum. The claim for authenticity in the case of the Genoa portrait is of course purely legendary, and the subject narrows itself down to a question of the authenticity of copies of it. One feels it, however, to be not entirely impossible that these pictures may be the survival of some remote and rude representation of the head of Christ, if not contemporary, done from memory or from description handed down, probably somewhat modified and conventionalised by Byzantine taste. It seems a thread of possibility, but no more; nor is that question considered in the article.

The *Berliner Architekturwelt* contains an article written by Professor A. Gotthold Meyer, on "Two Textbooks of Palatial Architecture" (Zwei Lehrbücher Fürstlicher Baukunst). The first of these books, by Paul Decker, appeared in 1711, and the author confined his attention to residences or palaces suitable to "a great lord, who has to rule over his country and people, and whose high position must be indicated in the splendour of his state and residence." In order to carry out Decker's designs he would moreover have to possess fabulous wealth. This constitutes the charm and also the danger of these idealistic plans. Neither the site nor the materials present any difficulties; ways and means are ignored, and it only remains for the artist to think of a sufficient number of buildings for all possible occasions, and, above all, to display a sufficient wealth of imagination; from this point of view Decker certainly succeeded. His work, however, is chiefly interesting as representing a phase in the history of Architecture, and does not bear any personal significance. About four generations later, Karl Friedrich Schinkel brought out a similar work, describing the plans of a residence, which, "whilst within easy reach of a large town, should contain within itself all the necessaries and accessories for the highly-cultured life of its princely owner." Schinkel has less to say than Decker, for he maintains that "the explanatory word can only be an accompaniment. Here, the artistic representation of the object can be the only true mode of instruction." There is a marked contrast in these two conceptions of a palatial residence. Decker provides for festival halls, barons' halls, courts, playhouses, grottos and orangeries; Schinkel considers rooms for collections of brasses and coins, etc., a theatre for the representation of dramatic works, galleries for antique statues, picture galleries, a church, etc. One of Decker's designs is of the most fearful and monstrous *rococo;* Schinkel's, of course, are founded on Greek lines, and contain some fine architectural suggestions. Among the general illustrations two fronts by Herr Messel, of Berlin, in despite of some oddities of detail, show architectural character and expression.

In the *Architektonische Rundschau* two country houses by Herr Schutte, of Barmen, effectively illustrated in broadly-tinted elevations, may claim the praise (not often to be given to German country house designs) of being picturesque without eccentricity. But we have the latter element provided in the Villa Stroblberger, by a Munich architect, a sort of nightmare of a house, with a plan twisted into all kinds of shapes, and in the street house in Eisenacher-strasse in Berlin (Herr Paul Jatzow), with its door cut out of the middle of a great circular framework, in the true style of German cleverness. But the most noteworthy thing in the number, in one sense, is the presence of a most daintily-executed little chromolithograph showing an interior in early Georgian style by Messrs. Heal and Son of London. It is the first illustration of English work that we remember to have seen in the *Rundschau*. Perhaps, having discovered the existence of an English furniture firm, we may even hope that the editor of the so-called "Rundschau" may some day recognise the fact that there are English architects.

Public Works is this month very much occupied with Glasgow; there are articles on "The Art Galleries and Museums of Glasgow," by Mr. James Paton, the superintendent of the Glasgow Art Galleries; on "The Glasgow Main Drainage System," by the City Engineer (Mr. McDonald); "Glasgow Municipal Telephones," by Mr. A. R. Bennett; on "Glasgow Botanic Gardens," and on the Glasgow Municipal Buildings, the latter by Mr. W. Macleod; it is merely descriptive, not critical. "Navigable Waterways in Belgium" is the subject of an article by Mr. Hertslett, the British Consul-General of Belgium. The article is a very interesting one, and shows how fully inland navigation is developed in Belgium. About 85 per cent. of the navigable waterways are under the direct control of the State, which is also a large shareholder in the canals conceded to private companies. There is a short article on "The Structural Aspect of the Housing Problem," specially in reference to Glasgow, by the City Engineer. The cheapest houses the Corporation have been able to build are 145 houses of two apartments, letting at 8*l.* a year, and 112 of single rooms letting at 5*l.* a year; built at a cost of 4½d. per cubic foot. These undertakings just clear themselves, but they do not provide for the poorest class. The writer says:—

"The only way in which the housing of persons of this class can be approached is to recognise that the habitations provided for them must be structures of a special type, wherein everything is reduced to the simplest form, and everything that is not absolutely indispensable must be discarded. A weatherproof shelter with ample space, water supply, and sanitary accommodation, but little more; the whole details so rigidly plain that some relaxation of the Building Acts may be required should the erection of the houses be resolved on; but a clean, healthy dwelling, in every way preferable to the abodes of squalor and misery in which the nethermost units are huddled together at the present moment."

Mr. M'Donald gives specimen plans of three types of block dwellings for this purpose, in double and single apartments, which are very compact; but the system of placing the bed in a recess of its own size is not healthy. It would be better to have a turn-up bed which would fold up into a shallow recess during the day, and stand out on the floor at night. Sleeping in the confined air of a recess means want of ventilation.

The *Antiquary* contains an article by Mrs. Cuthell on "The Manor-Houses of the Isle of Wight," partly historical in regard to families etc., partly descriptive in regard to the buildings themselves—Yaverland, Arreton, East Standing, and others. The article is to be continued. The subject is an interesting one, not only as all old houses are of interest, but because, as everyone who knows anything of "the Island" must have noticed, Isle of Wight architectural developments are peculiar and have strongly marked local characteristics. Mr. George Bailey contributes an article on "The Wynne Brasses at Llanrwst," which are attached to the wall of the Gwdyr Chapel at St. Mary's, Llanrwst, which chapel, added to a church of the Perpendicular period, is credited to Inigo Jones. Illustrations of these brasses are given; they show portrait heads enclosed in square frames set lozenge-wise. The second, that of Lady John Wynne, furnishes a careful and detailed illustration of the head-dress, collar, and coiffure of a lady of the Charles I. period.

Blackwood, under the heading "Musings without Method," gives some trenchant comments on the result of the Chantrey Bequest Commission—one of the many evidences which show how strongly the action of the Royal Academy in this matter has affected the best class of public opinion. We agree in spirit with the comment, except in regard to the writer's favourable view of the Committee's proposal to commission sculptors to carry out, in monumental materials, works only finished in plaster or clay; a proposal which we consider as essentially contradictory of Chantrey's provision that no commissions were to be given. The writer expresses only what is the plain truth in his remark—"That the Trustees should buy one another's works at comfortable prices is no doubt convenient to them, but it is a direct violation of Chantrey's wishes." The most noteworthy point in the article, however, is the warning which it gives that the public will not much longer put up with the Academy's policy of sublime indifference to all outside opinion. "So long," he observes, "as the number of shillings taken at the doors shows no decrease, the Academicians will regard themselves and their works as above and beyond criticism, even though a gentle acquiescence might be to their advantage. But if they remain obdurate, one day they will find less shillings in the till, and then at last they will realise that in their pride they have killed the goose that laid the golden eggs."

The *Fortnightly* contains an article on G. F. Watts by Professor W. Knight. It is not so much a criticism of his artistic work as a reminiscence of many of Watts's sayings and opinions on men and things; all of them interesting and characteristic, but not all very balanced or central in judgment. To tell a friend who had just returned from Rome, and whom he met at the exhibition of Burne-Jones's pictures in the New Gallery—"Well, in all Rome you saw nothing finer than this, nothing finer than this," certainly savours more of loyalty to a friend than of a sense of the proportion of things. Professor Knight hammers away over and over again at the point that Watts's persistent idea was to make Art a means of moral teaching. Watts undoubtedly thought so in the latter years of his life; he seems to have forgotten the days when he painted such a work as "Daphne"—one of his most beautiful and perfect productions, of which we hear nothing now, so much has this unfortunate idea of Art as a preacher taken possession of the minds of Watts's admirers. But what sane critic would put Watts's latter-day paintings of Eve, for instance, or his almost grotesque typical figure of "Woman," beside a work of such classic beauty as the "Daphne"? But there is no sane criticism about Watts at present; we have not seen an instance among the numerous magazine articles of anything like a serious and thoughtful attempt to discriminate between the greatness and defects of his work. Of the nobility and greatness of Watts's character, apart from his art, there can however be no two opinions. Professor Knight mentions some fine traits of

this; among others (what we have not seen mentioned before) his withdrawing, at the age of 74, from his right as an Academician to place his pictures; requesting to be judged by the Hanging Committee along with the outsiders, lest in his old age he should unconsciously have produced what would do himself or the Academy injustice. When one remembers the absurdities which certain aged Academicians continued to inflict on the public year after year, one cannot too much admire such a noble reserve and distrust of himself as Watts showed in thus acting.

To the *Monthly Review* Mr T. Andrea Cook contributes an article "On the Romance of Coinage"; a slight sketch of some of the points of interest in coins and medals ancient and modern. He shows good reasons for thinking that our modern effigy of Britannia with the shield may be traced, in its main composition, to a medallion of Commodus. The *motif* occurs in a farthing of Charles II. and one of Anne, with differences of detail. The Britannia on the penny of 1860, though a little stiff and academic, is a better design, in decorative line, than that on the penny of 1901. The medal commemorating the sixtieth year of Queen Victoria's reign is contrasted with the medal of the French Republic, with its beautiful head with a crown of leaves; the two are typical of the two nations; the sober realistic portrait on one, the *spirituelle* ideal head on the other. But then, of course, a Republic can be symbolised and idealised, while a sovereign's coinage must show the sovereign's head. The same contrast is even more strikingly shown in the penny of 1902, with the King's head, and the French *sou* of the same year, with its lovely ideal head of the Republic again, a quite different design from the other, and even more fascinating. The point is, that in our own coin not the slightest attempt is made to treat the portrait head with any decorative accessories (except a row of dots round the rim of the coin); it is stamped blankly on the circular space, for which it appears too large, in the most prosaic and practical manner. The two coins emphasise painfully the difference between an artistic and an in-artistic nation.

The short article on "Radium: Its Properties and Possibilities," by R. J. Strutt, in *The National Review*, deserves to be widely read. It gives a clear and reasoned account of our present knowledge, and is more instructive than any of the books on radio-activity which we have read. It is not burdened with the names of unknown scientists who have obtained experimental results, apparently at hap-hazard, or whose brilliant and daring speculations on the nature of matter have startled authors. With the exception of Helmholtz, no scientist's name is mentioned. The article is imbued with the true scientific spirit. The temperate statement of the facts and the consistent explanations given by Mr. Strutt will be appreciated by every thinking reader. We were especially struck by the way he proves that radium is not a permanent metal, and how, by supposing that there is a constant evolution of radium in the sun, the millions of years of temperate warmth required by geologists and zoologists to account for the strata and the fossils in the earth's crust can be reasonably obtained.

Harper contains an article by Mr. G. W. Ritchey, Superintendent of Instrument Construction at the Yerkes Observatory (U.S.A.), on "Photographing the Star-Clusters." The article is accompanied by some fine photographs of star-clusters, included a view of the Pleiades group. It appears that the ordinary system of a clock-driven telescope to follow the object in the heavens is not sufficient for these delicate observations with very large telescopes, the movement of the telescope not being sufficiently perfect to give sharp photographs:—

"It is necessary to devise some means by which the astronomer can watch throughout the entire time of the exposure of the photographic plate, can detect any minute movement of the image of the celestial object from its proper position, and can instantly correct or compensate for such movements. There are several methods in use of accomplishing this hand-guiding or correcting; the most refined method is by the use of an attachment called the double-slide plate-carrier. The observer sits with his eye at the guiding microscope of the attachment, and with his fingers on the milled heads of two fine adjusting screws, and he is able to introduce with extreme accuracy and quickness any corrections which he sees are necessary."

Mr. Ritchey believes that when a reflecting telescope is constructed equal in power to the largest refractors, through which observations can be continued for a long term of years, we may be able to observe and chronicle changes in the star clusters which are too slow to be detected by our present means.

The same issue contains an article on "Ravenna" by Mr. Arthur Symons, which however is of merely literary value—a record of personal impressions given in picturesque language.

In *Scribner*, under "The Field of Art," Mr. Russell Sturgis gives a description and criticism of the pediment sculpture of the New York Stock Exchange, by two American sculptors, Mr. J. Q. A. Ward and Mr. P. W. Bartlett, the original model having been by Mr. Ward. The New York Stock Exchange shows the façade of a Greek temple in the Corinthian style; on the pediment are a collection of a few figures on colossal scale and in very bold relief; mostly nude, the muscular development of the figures being, according to Mr. Sturgis, considerably and purposely exaggerated. The sculptor seems to have found the usual difficulty in dealing with the low angle spaces of the pediment, and his nude figures sprawled on the top of the cornice at this point are not very dignified. The whole thing however, seems from the illustrations to be a powerful piece of work; but the question is whether it is not all, architecturally and sculpturally, a mistake. What has the purpose of a Stock Exchange in New York to do with this Greek temple decoration? "Reminiscences of Sir Henry Stanley," by Mr. Mounteney-Jephson, is a short paper which will interest many English readers.

The *Century* contains an article on "The Dinosaurs of the Bone Cabin Quarry," by Mr. H. F. Osborn. The Bone Cabin, in Albany, U.S.A., was discovered by Mr. Walter Granger of the American Museum expedition, in 1897. It contains bones of extinct animals of enormous size and length of limb and neck, of which some restorations are given, not so conjectural as might be hastily supposed, for the complete skeleton structure is there. The article is a very interesting one, and Mr. C. R. Knight's illustrations are admirable. "Japan's Highest Volcano," the subject of an article by Mr. H. G. Ponting, is not Fuji, which is extinct, but the highest active volcano, Asamayama. "Ballooning as a Sport," by Mr. G. de Geofroy, gives some practical experiences as to the conditions of ballooning, especially in regard to the modern quasi-dirigible balloon.

In the *Gentleman's Magazine* Mr. Dunlop-Wallace-Goodbody concludes his long article on Forum Julii or Fréjus, a very interesting historical summary, coming down to the day when the Cæsar of modern times took up his temporary abode at Fréjus on his way to Elba. The same number contains an article by Mr. Vincent Heward, F.R.A.S., on the planet Mercury, summing up some of the results of modern telescopic information, among which is the fact (of which at least Schiaparelli, after a long series of observations, entertained no doubt) that the relation of Mercury to the sun is the same as that of the moon to the earth; the planet having no diurnal revolution, and presenting always the same face to the sun. On such a planet, exposed to a tremendous glare on one side and perpetual darkness on the other side, there can be at all events no life comparable to life on the earth; and probably Mercury, like the moon, is an arid waste.

The *Pall Mall Magazine* has an article on Montagu House, Whitehall, the Duke of Buccleugh's town mansion, with illustrations of some of the principal rooms, with their sumptuously decorated ceilings and cornices, and a description of some of the artistic contents of the house. Mr. Lewis Hind contributes an article under the title "A Day with Velasquez," commenting on the contents of the Velasquez room in the Prado Museum at Madrid, the central object of which is what the writer justly characterises as "the greatest historical picture mortal man has produced"—"The Surrender of Breda."

CONVALESCENT HOME, SHOTLEY BRIDGE, DURHAM.—A new wing of the John Spencer Convalescent Home for Sick Children at Shotley Bridge was opened a short time ago. The building is three stories in height, and will provide accommodation for sixty-five additional children, with dining-hall, kitchen, lavatories, and nurses' quarters. The work has been carried out under the supervision of Mr. D. M. Spence, architect, of Shotley Bridge, and the contractor is Mr. T. A. Turnbull, of Rowland's Gill.

THE ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A MIDLAND Counties meeting of the Association of Municipal and County Engineers was held at Birmingham on Saturday, for the purpose of inspecting the sewage works of the Birmingham, Tame and Rea Drainage Board. The Birmingham works are of very great interest, by reason of their extent, and the important experiments in the bacterial treatment of sewage conducted by Mr. J. D. Watson, Chief Engineer, and the meeting brought together a large number of members from all parts of the country. Mr. A. T. Davis, County Surveyor of Shropshire, President, occupied the chair, and there were present Messrs. J. D. Watson (Birmingham), J. T. Eayrs (Birmingham), J. E. Willcox (Birmingham), C. F. Wike (Sheffield), W. Harpur (Cardiff), R. E. W. Berrington (Wolverhampton), J. W. Brown (West Hartlepool), W. H. Hopkinson (Keighley), T. Schlund (Woolwich), R. Pierce (Singapore), W. Stubbs (Blackburn), T. J. Guilbert (Guernsey), H. Richardson (Handsworth), hon. sec., J. P. Norrington (London), A. H. Campbell (East Ham), F. W. Ruck (Maidstone), E. W. Holmes (Walthamstow), and others.

The morning was occupied with an inspection of the purification works at Minworth Grange, including the regulating chamber, Dortmund tanks, experimental bacteria beds, and primary and secondary percolating beds.

The President and members of the Association then drove to the Home Farm at Tyburn, where they were entertained to luncheon by Mr. J. D. Watson.

The President proposed the health of Mr. Watson, and thanked him for giving them an opportunity of going over the works, which extended to nearly 3,000 acres.

Mr. Watson, in reply, explained that they had a Drainage Board constituted by Act of Parliament, which included Birmingham—the predominant partner—Aston, Handsworth, Erdington, Smethwick, Sutton Coldfield, and one or two minor places, which had combined together or treating the sewage of a population of 860,000. Formerly the whole system was that of broad irrigation and downward intermittent filtration, but they were now changing it to the bacterial system, though they had a sewage very hard to septicise, as it contained a large amount of iron salts. While they were going in for bacterial treatment very largely, they were not dissatisfied with land treatment, from which they had obtained a purification of 92 and 93 per cent. Their idea was that if they could reduce the area on which they disposed of the sewage they would minimise the chance of nuisance, and they would not have so great a difficulty as to the area of land.

The district business was then transacted, and on the proposition of the President, Mr. H. Richardson, of Handsworth, was re-elected secretary for the Midland district of the Association.

Mr. G. A. Hart read a paper on recent experience in sewage and sludge disposal at the Saltley Outfall Works of the Birmingham, Tame and Rea District Drainage Board. He said the modifications which had been introduced from time to time into the general method of sewage treatment adopted at the Saltley Works during the last three years appeared to have a somewhat interesting bearing in relation to the general question of sewage and sludge disposal. In 1900 the outfall works then constructed for the tank treatment of the sewage and the disposal of the sludge at Saltley, consisted of:—First, an installation of three tanks for preliminary treatment of the sewage, called roughing tanks. Each tank averaged 328 ft. long by 94 ft. wide, and 5·64 ft. deep, having a total combined holding capacity of 3,216,100 gallons. Each of the tanks was rectangular in plan, with side walls constructed of brickwork, and had brick-paved floors, having a slight fall lengthways from the outlet towards the inlet end. They were divided into three sub-divisions by cross walls carried up to within 2 ft. of the sewage surface. The compartment at the outlet end consisted of one-half of the total capacity of each tank—*i.e.*, holding about 500,000 gallons. The remaining two compartments of each tank were of equal size, and held about 250,000 gallons each. Floating scum-boards to prevent the passage of floating refuse, such as corks, etc., were fixed across the inlet end of the tanks. The contributory population to the outfall works was estimated at 707,000, and the average daily dry weather flow was estimated

at 21,000,000 gallons per day. The sewer inlets entered the tanks at a level of about 3 ft. above the floor, and the flow of the sewage was regulated through each of the tanks in parallel. After passing through these preliminary tanks the sewage was conducted into the second installation of tanks, termed finishing tanks. These were also constructed of brickwork, with brick-paved floors, having a fall from the centre line to the inlet and outlet ends respectively. There were sixteen of these tanks, each measuring 150 ft. by 50 ft. wide, with an average depth of 6·07 ft., having a total holding capacity of 4,539,500 gallons. The combined total roughing and finishing tank capacity at the outfall works therefore amount to 7,755,000 gallons. Sumps were constructed in the floors of the compartment of the tank for the collection of the sludge. A Priestman grab attached to a steam crane, travelling in a 4 ft. 8½ in. gauge tramway, extracted the heavier detritus, which was deposited in tip wagons, and at once removed and tipped in the form of a surplus soil bank in the immediate vicinity of the works. Early in 1902 the outfall works were extended by the addition of two further roughing tanks. They were of similar construction to the tanks previously described, holding about a quarter of a million gallons each, and four additional finishing tanks, and having each a holding capacity of 680,920 gallons. No further addition to the tank capacity of the works had since been made. The total combined roughing and finishing tank capacity at the present time was as follows:—Five roughing tanks, 5,610,150 gallons; twenty finishing tanks, 7,263,180 gallons; total tank capacity, 12,873,330. Simultaneously with the increase in the tank accommodation, storm-water filters of an area of half-an-acre each, and containing medium to the depth of 5 ft., consisting of screened gas coke, were constructed for the treatment of storm-water conjointly with the tank extensions. A cast-iron underground sludge main was permanently laid about 4 ft. deep, extending from the outfall works for a distance of 2½ miles through the farm-lands to Castle Bromwich. New buildings were erected containing two Lancashire boilers, each 30 ft. long by 8 ft. diameter, and the existing engines were rearranged and connected to a pair of belt-driven air compressors, which supplied compressed air to a series of four Shone's pneumatic ejectors, which were connected with the cast-iron sludge main. Two additional sludge pumps were installed in the engine-house for the purpose of extracting the sludge from each of the tanks. From the year 1872 to February, 1901, the general system of sewage treatment at the works consisted of chemical precipitation, followed by subsequent sedimentation in the two installations of tanks termed roughing and finishing tanks, the final tank effluent being subsequently treated on land. The cost of the lime treatment amounted, in the year 1900, to 4,332*l.*, which was equivalent to a cost of 11s. 6d. per million gallons of sewage treated. On account of the rapid increase in the volume of sludge precipitated by the liming process, it was decided to entirely suspend the liming of the sewage, and to commence the promotion of bacterial action in the tanks. It was predicted that it would be practicable by adopting a method of frequently and rapidly removing from the roughing tanks the sludge as it was deposited, to counteract the effect of some of the acidified discharges of sewage which periodically passed down to the works by increasing the effective tank space, and that an important advantage anticipated by the promotion of septic fermentation would be a reduction in the volume of sludge produced in the tanks, together with a saving in treatment at least amounting to the cost of the unslaked lime. To counteract this advantage it was anticipated that the tank effluent resulting from bacterial action and sedimentation would contain a much larger quantity of suspended matter than the chemically precipitated effluent had hitherto produced, and some anxiety was felt as to the result of the application of the unlimed tank effluent upon subsequent land treatment, and it was satisfactory to be able to say that, as the result of a further investigation upon this point extending over the last three years, it had been established that the land effluents had shown annually a gradual improvement. On the albuminoid ammonia and oxygen absorbed bases, in terms of percentage of purification upon crude sewage, this improvement was indicated by the following figures:—1901, albuminoid ammonia basis per cent. 88, oxygen absorbed basis per cent. 88; 1902, albuminoid ammonia basis per cent. 92, oxygen absorbed basis per cent. 90; 1903, albuminoid ammonia basis per cent. 92, oxygen absorbed basis per cent. 93. The effect of the change in treatment from chemical precipitation to septic fermentation in the volume of sludge arrested in the tanks justified anticipation. As a result of fifteen months' observation, it might be stated that the reduction in volume of the sludge deposited in the tanks amounted to 58 per cent. of the total bulk, expressed in terms of cube yards of sludge per million gallons of dry weather flow. The figures were as follows:—Lime treatment, 35·55 cubic yds.; septic treatment, 14·85 cubic yds. This method of treatment was consistently followed out until March, 1903, but a disturbing element which had an appreciable effect upon the treatment was introduced in 1902 by the addition of two extra roughing tanks and four finishing tanks. This additional tank accommodation, representing an increase of 66 per cent., increased the volume of sludge deposited in the tanks by 22 per cent., making the total volume of sludge deposited per million gallons of dry weather flow amount to 18·20 cubic yds. Simultaneously with the increased tank accommodation, a storm-water weir was constructed in the roughing tank effluent channel. The combined sewage and storm water was now treated together in the five roughing tanks, and the storm water after sedimentation being automatically diverted over the storm overflow weir for subsequent treatment on straining filters before its final passage into the river Tame. In its passage from the tank into the sludge suction-chamber the sludge was passed through an iron screen of about 1¼ in. mesh, to which was attached a revolving rake which effectively extracted from the sludge the cloths, rags, and similar fibrous material. This method had proved most effective; its chief recommendation being that in lieu of a large quantity of elaborate screening machinery which would be required if this comparatively small percentage of fibrous material were extracted from the crude sewage, it had been found quite practicable to allow the material to deposit itself and remove it in bulk in a comparatively short time; the whole of one week's sludge being effectively screened and removed from each tank in about six hours. The average volume of liquid sludge removed per day from the tanks for the past thirteen months amounted to 590 cubic yds. per day on an estimated dry weather flow of 22,000,000 gallons per twenty-four hours, which was equivalent to 26·22 cubic yds. per million gallons treated. The effect produced by this system of frequent cleaning was to increase the volume of liquid sludge deposited in the roughing tanks by 44 per cent. The propagation of septic fermentation in the finishing tanks, together with the frequent cleaning of the roughing tanks, was continuously followed for a period of thirteen months. As the result of observations taken during that period it was conclusively established that, although the efficiency of the roughing tanks for sedimentation had been increased 44 per cent., the septic tanks gave unmistakable evidence of becoming inert. The most reasonable theory which the author could put forward to account for this phenomenon was to the effect that the increase in the effective roughing tank capacity produced such a degree of sedimentation that the greater bulk of the organic substances containing the fermentative organisms necessary to promote septic action were deposited as sediment in the roughing tanks, and the finishing tanks were therefore deprived of the elements upon which their septic action depended. To remedy this defect, in May, 1904, directions were given that the whole of the lighter organic sludge which was deposited daily in the roughing tanks should be pumped into the septic tank inlet channels. The quantity of sludge thus transferred from roughing to finishing tanks had been gradually increased during the last three months, and at the present time a volume equal to 30 per cent. of the total sludge deposited, was daily passed into the septic tanks. There had been no indication that the finishing tanks had attained their ultimate efficiency; the fermentative action was almost immediately restored, and was being gradually increased month by month. It was interesting to observe that, as a result of three and a half years' continuous septic fermentation in the finishing tanks, extending from March, 1901, to May, 1904, the residual products deposited therein during that period, and which it had been deemed advisable to remove therefrom in the form of sludge, had only amounted to the volume of 25,000 cubic yds., that was a volume equal to half the holding capacity. The septic residuum was deposited on land in a layer of about 15 in. deep. It gave rise to no offence, no smell had been detected arising therefrom, and, after lying open and exposed to the action of the atmosphere for six months, and being ploughed over, it would be difficult now to differentiate between the appearance and characteristics of natural surface soil and this material. There appeared to be some foundation for the belief that many of the very real difficulties which attended the removal and disposal of sewage sludge might be alleviated by judicious tank treatment, and it appeared to be equally essential that the utmost care and regard should be given to detail in the application of the treatment; and to the design of those works dedicated to the various functions embodied in the treatment if results of an efficient and generally satisfactory kind were to be produced. The average yearly current expenses occasioned by the treatment of the sewage by chemical precipitation with lime and disposal of the sludge was 7,785*l.* 19s. 10d. The average yearly current expenses occasioned by the treatment of the sewage by sedimentation and septic fermentation was 3,092*l.* 3s.

Mr. A. Bryan, resident engineer, gave a description of the purification works in course of construction at Minworth Greaves. He said the works, being constructed by the Birmingham, Tame, and Rea District Drainage Board for the bacterial purification of sewage, were situated in Sutton Coldfield, and were distant some five miles from the outfall works at Saltley. The works in course of construction comprised:—(1) An intake chamber to form the connexion between the existing main supply conduit and the new works, in which was fixed an apparatus for automatically regulating the flow of sewage, so that in dry weather a constant volume would be delivered to the bacteria beds. (2) A series of silt or sedimentation tanks to remove the suspended and floating matter present in the septicised sewage. (3) An installation of primary percolating beds to effect a partial purification of the sewage. (4) The provision in the main effluent channel for the primary beds of a sedimentation tank to arrest the humus in the filtrate. (5) An installation of secondary percolating beds to complete the work of purification in the event of land not being available for the purpose. The works, with the exception of the 1½ acres of experimental beds, which had been constructed by direct labour under the author's supervision, were being carried out by contract by the following firms:—Constructional work, Mr. W. Cunliffe, Birmingham; cast-iron pipes, The Clay Cross Iron Company; sluice valves, Messrs. Guest and Chrimes, Rotherham; special distributing pipes and flexible joints, Messrs. Jones and Attwood, Stourbridge; aërating floor, Mr. H. R. Mansfield, Church Grisley; medium (bricks), Messrs. Freakley and Co., Tipton.; medium (granite), Jees Hartshill Granite Company, Atherstone. In many percolating beds recently constructed the bottom layer of medium had been composed of large material, the object being to allow the effluent to drain freely from the bed. In beds constructed on this principle the water, in finding its way to the channels, pursued a very erratic course through the intricate passages between the medium, and repeatedly changed its direction before it was clear of the bed. This must of necessity cause many small eddies and backwaters, in which the suspended matter, which had no great difficulty in finding its way by gravity to the bottom of the bed, was deposited in a gradually increasing quantity, which would in time render the lower portion of the bed useless for drainage purposes or for aëration, and the medium would consequently need to be taken out, cleaned, and replaced. The use of an open or aërating floor between the medium and the floor of the bed in a great measure minimised this defect. The effluent, after percolating vertically through the bed, was at once entirely removed from contact with the medium, and found a clear course open to the channels. The depth of water over the floor might be considerable, and still leave the necessary air space beneath the medium; thus, the floor of the bed might be laid to a flatter gradient and head economised. The suspended matter was carried by the flow into the channels and there dealt with. The author had found, first, that the use of floors provided with circular

holes was not satisfactory, as they became stopped up with portions of medium; and, second, that a flat floor had in some degree the defects of allowing the sediment to collect on the flat surface. It was also found at Saltley that the rough brick walls of the small channels forming the floor of the storm filter beds had become coated with mucilage, similar to that found coating the medium of the bed. To minimise these defects the author designed the curved tile used for the beds, and he thought that the smoothly-glazed round surface would allow the sediment to easily reach the slots, which were carried right down to the foot of the tile. The long, narrow slots could not become entirely filled by the medium, and that when the floor was carried through the walls of the bed the slimy coating and any heavy sediment could easily be flushed out, as the force of the flushing water was not destroyed by being allowed to spread out in all directions and become obstructed by the feet or supports of the floor. The distinct channels also induced a current of air, especially on windy days, and thus helped in dispersing the heavier gases generated in the bed. It was found after the beds had been resting for any length of time, that on restarting them the first trickle of effluent from the beds provided with aërating floors reached the channel in about thirty minutes, and from the floor covered with large slag in forty-five minutes; also that the flow from the tiles was general in about sixty minutes; whilst, after two hours, about one quarter of the circumference of the channel draining the slag portion of the bed was still dry. The effluent for some time was very turbid, and contained a large amount of suspended matter, the sediment in the effluent draining from the tile floor being two to three times greater than from an equal area of bed covered with slag. The sediment contained 26 per cent. of organic matter, chiefly broken-down mucilage from the bed. The amount of sediment from the beds appeared to increase somewhat rapidly every three or four weeks, and the oxygen absorbed increased at these times. This was no doubt due to the suspended matter making its way through the medium and collecting on the concrete floor until it was in sufficient quantity to be washed away. When the sediment made its appearance, the channels and tiles were flushed out and cleaned with drain rods, after which the effluent was again clear. The analyses of the effluents showed that a very high nitrification was obtained from the whole of the beds, and the author believed this was largely due to the provision of an aërating floor, combined with the use of a fairly large (3-in. gauge) medium for the lower portion of the beds.

Mr. A. J. Dickinson (Birmingham) wished to know whether the putting of Westrumite on the roads of Birmingham had affected the quality of the sewage, and whether it could be identified in the analysis.

The President proposed a vote of thanks to the authors of papers.

Mr. G. W. Lacey (Oswestry), who seconded, said a good deal of information had been given as to the materials used in the bacteria beds. He wished to know whether the revolving sprinklers had been found satisfactory in work.

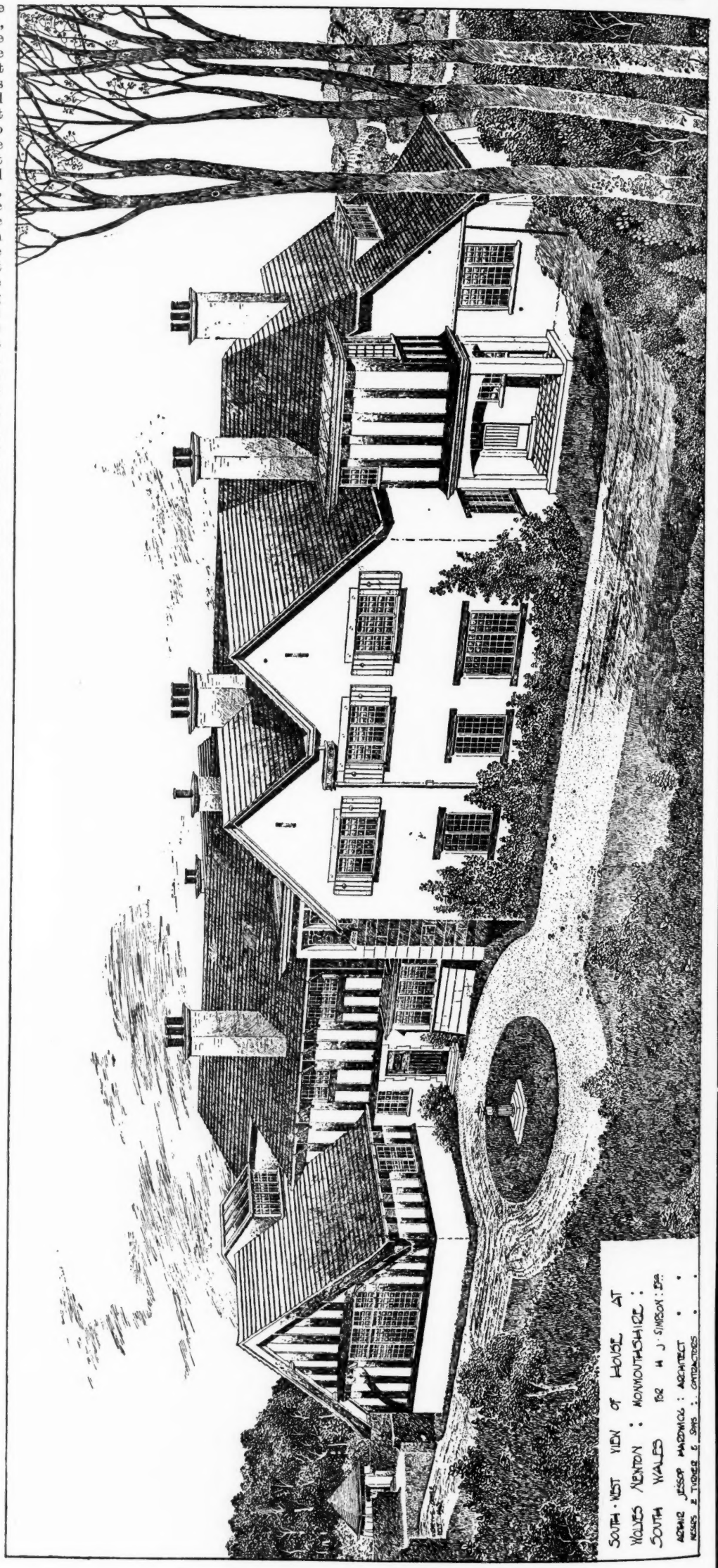
Mr. J. E. Willcox (Birmingham) remarked that the papers contained a great deal of valuable information, more particularly with regard to cost.

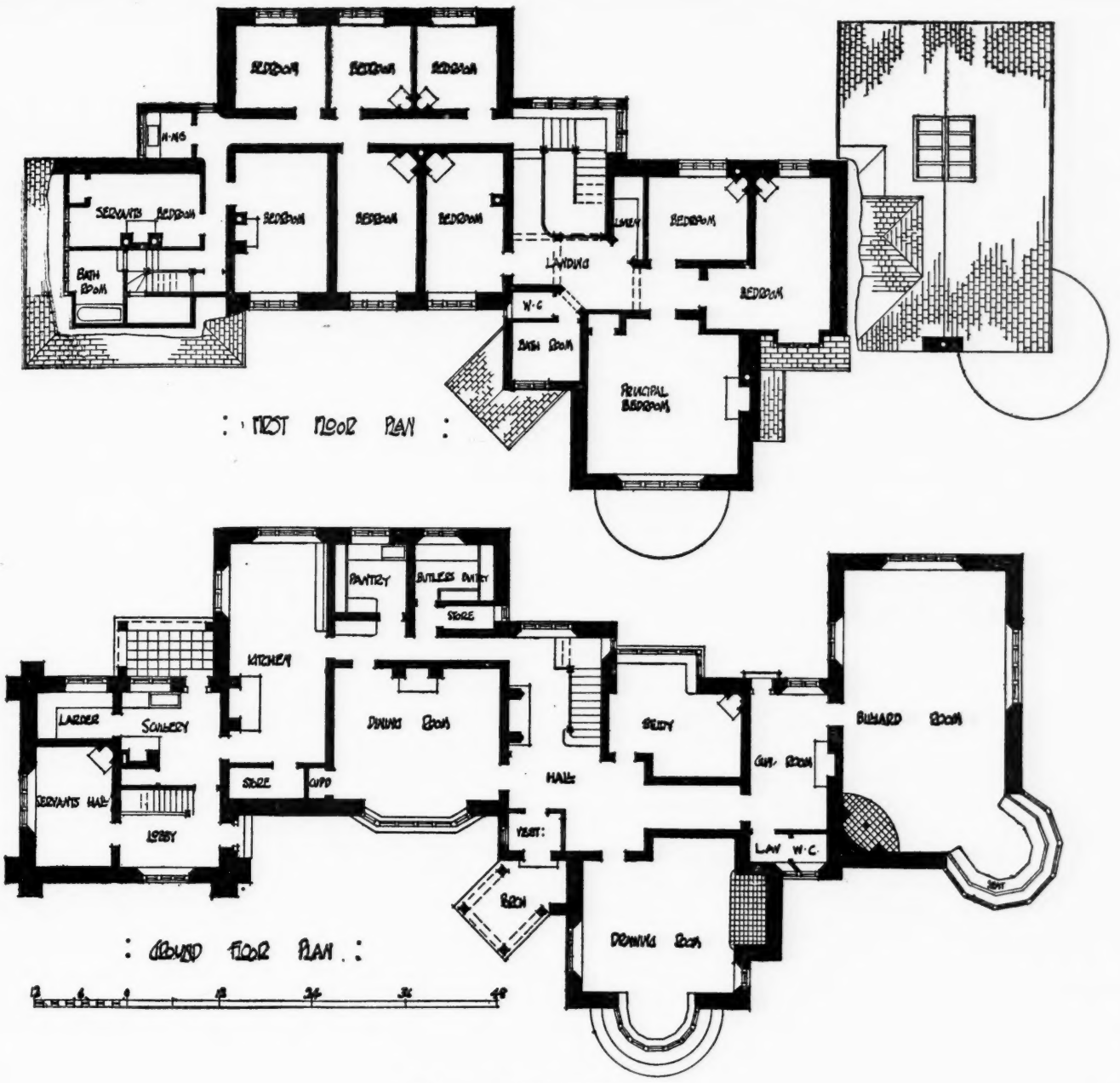
The vote of thanks was unanimously accorded to the writers of papers.

Mr. J. D. J. Roberts, architectural assistant, gave a description of the refuse destructor and electrical power generating station in course of erection at Saltley.

The remainder of the afternoon was devoted to an inspection of the Saltley works, including the sedimentation works, septic tank, sludge screening and sludge ejecting machinery, and the storm-water filters.

NEW SCHOOL, CARLISLE.—The new school which has been erected on a site at the corner of East Dale-street and Denton-street, Carlisle, was opened recently. The building is two stories in height, the ground floor being for infants and the first floor for senior boys and girls. There is a central hall and six classrooms on each floor. The total accommodation provided is for 720 children, 360 infants and a similar number of boys and girls who have passed into the standards. The total cost was about 9,000*l*. The architect was Mr. Brierley, of York.


SOUTH-WEST VIEW OF HOUSE AT
WOLVES NEWTON : MONMOUTHSHIRE :
SOUTH WALES FOR H. J. SIMSON: ESQ.
ARTHUR JESSOP HADDWICK : ARCHITECT
NEALE & TURNER & SONS : CONTRACTORS



House, Wolves Newton. Plans.

HOUSE AT WOLVES NEWTON, MONMOUTHSHIRE.

THIS house was erected on a site overlooking the valley towards Abergavenny and the Sugar Loaf Mountain, a distance of about twenty miles.

The entire walls are of stone and are externally covered with white rough-cast. All the external woodwork, main staircase, and interior of billiard-room (which has an open timber roof) is of oak. The bays to dining-room and staircase are in Bath stone. The roofs are covered with red Bridgwater tiles. The north-west view of the house was published in our issue for September 13, 1902. The view given this week was taken from the hill at the rear of the building.

The contractors were Messrs. E. Turner and Sons, of Cardiff.

Mr. A. Jessop Hardwick, of Kingston-on-Thames, is the architect.

THE DRAINAGE OF A HOUSE.

By W. R. PURCHASE.

IN your issue of August 27, pages 227-8, there is part of an abstract of a paper by Mr. Samuel Smith, read at the recent Glasgow Congress of the Sanitary Institute, *re* the above subject, in which the use of fireclay glazed drain pipes is advocated in preference to any other.

You were kind enough to insert in your journal of last year (Sept. 19, 1903) a brief article from me on "The Insecurity of Modern Drainage." Will you permit me again to make a few remarks on this important subject, from a practical point of view? As the building inspector to a Borough Council for the past twelve years, I have had on an average some three or four hundred new drains to test and approve each year; and prior to that for a few years was engaged in the supervision of a large pottery, where drain-pipes were chiefly made. This experience will, I trust, qualify me in some degree for expressing an opinion on this subject. I may perhaps add that I have no prejudice as regards the material used for pipes, beyond advocating sound and efficient drains, as promoting sanitation and thereby the health and well-being of the community.

This new advocacy of the fireclay drain-pipe is undoubtedly a retrograde movement, and anyone familiar with the composition of these pipes will, I believe, agree with me that they have only a comparatively short life, and should on no account be used for conveying sewage matter.

It may be stated that fireclay as a raw material is found in great abundance in the coal-measures beneath the several seams of coal, and is usually a waste product. The clay, when prepared, is capable of standing a high temperature without fusing or becoming soft, and is therefore called refractory; it has a very open grain, is porous except when protected by glazing, and is weak and brittle.

The glazing is effected by throwing coarse common salt (chloride of sodium) into the fires and kiln at a time when a certain degree of white heat is attained; the salt is at once decomposed, the chlorine escaping as vapour, while the sodium combines with the silica of the clay to form a surface coating of glaze, which in reality is a fine film of glass, covering every part of the ware exposed.

Fireclay is seen to a great disadvantage when compared with stoneware made from the clays of the Lias formation, in which the ware is vitrified throughout, intensely hard, dense in texture, non-absorbent and impervious to acids. The salt glazing in stoneware is the actual material itself fused together, differing from all other kinds of earthenware. The great imperfection in stoneware is its brittleness, which for drains generally is fatal.

The detects to which fireclay drain-pipes are liable are porosity and weakness of the material; cement in joints swelling and contracting; uneven expansion of concrete bed; careless filling in of trench by ramming, etc. In fairness, however, it should be said that some of these defects may be minimised if care is exercised in doing the work.

Most of the large cities, boroughs, and towns in England have framed their building by-laws on those of the "Model By-laws" which are adopted by the Local Government Board; in these it states that the drain-pipes shall be "of glazed stoneware or of other equally suitable material." This, as interpreted, virtually excludes fireclay, as it cannot be from its nature equally suitable; its use by the Local Government Board is therefore prohibited.

One of these fireclay drains came under my notice some few years since, in which the pipes used were supplied by a reputed London firm. The drain when laid would not stand the water test, and the result could be seen in the beads of water oozing through thickly all over the surface of the pipes. This drain, of course, was condemned and taken out, and stoneware pipes substituted.

The author of the article, Mr. Samuel Smith, has made various tests with these fireclay pipes—viz., pneumatic, hydraulic, acid, etc.—

all of which have turned out apparently to his satisfaction. But has he not proved too much? For he admits in one case that a second quality pipe tested by the pneumatic pump was "very porous," and when encased in 6 in. of concrete, and the air pressure increased, there was still a leakage.

A further test of the strength of fireclay pipes was made by hydraulic pressure (which is the only agent that should be employed in testing), and even then the pipes were found to be porous.

This is sufficient evidence, and tends to prove that pipes of this description are not fit to convey sewage matter.

The only point that can be conceded in their favour—and it is not always a meritorious one—is that they are cheap.

But is it any use pursuing this question of fireclay, or even stoneware, pipes further?

In my former letter I held (and it was not contradicted) that there was a consensus of opinion amongst observant men, sanitarians, and others, that the stoneware pipe as a material for house drains has in the past proved a failure; and although in theory the stoneware pipe forms a perfect drain, and should last for all time, yet, owing to its composition, and the physical agencies surrounding it, it has decidedly failed, especially in having no lasting properties.

My later experience since then still confirms that opinion, having again dealt with several decided failures.

My next point is the advocacy of cast-iron (porcelain-lined pipes), the best material we have at the present time for drains.

Mr. Samuel Smith states that "so long as cast-iron pipes can be kept free from corrosion, they may be regarded as being satisfactory for drainage purposes." But from the nature of his experiments on cast-iron pipes, and their preservatives, they are not to him satisfactory; although why a very weak solution of sulphuric acid attacked the glass-lined pipe, in one of his tests, it is difficult to say, when it is known that glass is not affected by the acid in question—in fact the acid is kept or stored in glass carboys, so that this glass-lined pipe was evidently a misnomer, and the test worthless.

Admitting some of these defects in cast-iron pipes, there is almost everything to be said in their favour—viz., superior strength and capability of resisting fracture, reduction in the number of joints (6 ft. and 9 ft. lengths compared with the 2 ft. and 3 ft. lengths of stoneware pipes), the greater security of the joints, which are run in molten lead, or Spence's metal, and do not injure the sockets by swelling, and are also absolutely water-tight.

The one objection, and perhaps the greatest, is their oxidation; this, however, may be yet overcome if our manufacturers will only rise to the occasion. The pipes, to be successful, should be glazed inside, and for this purpose they should be roughly bored through their entire length and to a defined gauge, then line with a coating of white porcelain enamel, burnt on so as to become almost an integral part of the iron, and left with a perfectly smooth finish. Large cast-iron baths, and other articles apparently more complex, are coated successfully with this porcelain, and the difficulty of treating cast-iron pipes in this way is not insuperable, especially with our advancing knowledge in metallurgy.

I should also like to reiterate what I formerly stated—that the drain of the future will be laid in a brick or concrete culvert, with stone cover and chambers for access, sufficiently large to admit a man (say, 3 ft. high by 2 ft. 6 in. wide) for the purpose of periodical inspection, so that the drain is at all times accessible and visible. The drain to be laid on blocks or bearers, about 9 in. above the floor of culvert, and at intervals of about 3 ft. apart.

At the least intimation or suspicion of anything being wrong with the drain, an examination can be made in a very short time, without cost, and it is at once seen whether the drain is doing its work safely and well or not.

It is admitted that this culvert system, and improved cast-iron drains, will add to the first cost, but it is a small matter compared with the advantage gained, and it is undoubtedly cheaper to incur this expense than to incur the expense of re-instating drains every few years, as at present found to be necessary.

The culvert may also be utilised for laying the water, gas, and electricity mains. This, too, would be a great advantage to a dwelling-house, as none of these mains should be covered up and hid from view, as they are in a great many instances at present.

In conclusion, with all the advancement made in sanitary science, it seems a pity that a scheme such as this should not be universally adopted, for there can not be the least doubt that it would tend to the improvement of sanitation, and hence the health and well-being of the community.

ENGINEERING SOCIETIES.

THE INSTITUTION OF CIVIL ENGINEERS.—The Council of the Institution of Civil Engineers have, in addition to the medals and prizes given for communications discussed at the meetings of the Institution in the last session, made the following awards in respect of other papers dealt with in 1903-1904:—Telford Premiums to Arthur Hill, C.I.E. (Bombay), F. A. Hurley (Cairo), E. M. De Burgh (Greystones), H. H. Dare, M.E. (Sydney, N.S.W.), William Marriott (Melton Constable), T. G. Gribble (London), W. H. Haigh (Cardiff). For students' papers the awards are:—A "Miller" Scholarship, tenable for three years, and the "James Forrest" Medal to C. W. L. Alexander, B.E. (Birmingham); Miller Prizes to J. M. Clark, M.A., B.Sc. (Glasgow), L. G. Crawford (Barrow-in-Furness), W. H. Dickenson, B.Sc. (Jesmond-on-Tyne), William Lawson (Newcastle-on-Tyne), C. G. Du Cane, B.A. (Middlesbrough), C. Gribble (York), J. E. Lister (Sheffield), J. M. Kernedy (London), H. Middleton (Newcastle-on-Tyne), J. D. Morgan (Handsworth).

Illustrations.

NEW CHAPEL, HERTFORD COLLEGE, OXFORD.

THE present chapel of Hertford College is a building of modern date, too small for the numbers of the College. It has been difficult to find space in the confined area of Hertford College for a larger chapel; but by sacrificing one block of rooms, which can be spared in consequence of the new building on the other side of New College-lane, and utilising a small piece of waste ground next All Souls' College, a considerable chapel can be provided, though only a small part of it, as shown in the illustration, can be seen from the College quadrangle. The east end will be well seen from the garden of the Warden of New College, on which it will abut, and also less conspicuously from New College-lane.

The architect is Mr. T. G. Jackson, R.A., and the drawing from which the illustration is taken was hung in the Royal Academy Exhibition this year.

HAGGERSTON PUBLIC BATHS.

THE accommodation provided in these baths includes a large swimming-bath, 100 ft. long by 35 ft. wide, and of a depth varying from 3 ft. 6 in. to 6 ft. Seventeen men's and five women's first-class and forty-nine men's and nineteen women's second-class slipper-baths, an entrance hall, 28 ft. by 16 ft., with a central ticket office, public cloak-rooms, a large swimmers' club-room, a public laundry fitted with sixty washing troughs and drying-horses, and five hydro-extractors, mangling and waiting rooms, a boardroom, and, in the attic story, residential accommodation for the superintendent. The boiler-house, the heater-room, the establishment laundry, and the store-rooms are placed in the basement floor.

In planning the swimming-bath an attempt has been made to solve the problem of enabling a large body of spectators to obtain an entirely unobstructed view of the whole water area of the bath. The ordinary plan under which the galleries for the public overhang the bath platforms is a very defective one, and, even when their staging is built on the raking lines of steel cantilevers or carriages inclined at an angle of about 45 deg. (as in the case of the Hoxton Baths), galleries so arranged are not wholly satisfactory. In the present instance the spectators' seats are in three stages, the lowest of which is placed about 18 ft. about the level of the bath platform, the dressing-boxes, sixty-nine in number, being arranged immediately behind the top stage of the public seating, which is planned to accommodate about 300 persons.

The engineering plant comprises three Lancashire boilers, 28 ft. long by 7 ft. in diameter, connected with the requisite feed and condense pumps, steam injectors, suction and delivery pipes, valves, etc.; a Green's patent fuel economiser, fitted with an electric motor for driving the scrapers, two large multi-tubular reservoir heaters, and electric motors for actuating the wash-house machinery and the ventilating fans.

The general heating is effected by radiators placed in the various rooms and corridors and connected with a low-pressure hot-water heating apparatus.

The walls of the swimming-bath hall, the suites of slipper-baths, the public and establishment laundries, and the public corridors and staircases are faced, and the bath tank lined with enamelled bricks supplied by the Farnley Iron Company.

The arched roof principals of the swimming-bath are of steel encased in ribs of panelled plaster, the lower portions of the lantern light are of glazed terra-cotta, supplied by the Leeds Fireclay Company, fitted with iron casements, and the upper portions have fixed glass roofs and domes.

The bath platforms are paved with patent interlocking rubber tiling, the gallery staging is of teak, and the enclosure of the slipper-baths are formed with slabs of St. Anne's marble.

Messrs. Killby and Gayford, of 87, Worship-street, E.C., were the general contractors, and the constructional steel-work has been supplied and fixed by Messrs. Homan and Rodgers.

The engineering plant was installed by Messrs. Z. D. Berry and Son, and Messrs. Hemmingway and Pritt carried out the electric lighting; the ornamental metal-work was supplied by Messrs. Benham and Froud and Thos. Elsley, Ltd., and the ship vane by Mr. George Wragge.

The figures, in low relief, on the pediment of the main front were modelled by Mr. F. E. Schenk and carved by Messrs. Martyn and Co.

Externally the buildings are faced with Lawrence's red bricks and Portland stone.

Mr. H. Barton was the general foreman, Mr. F. C. Saunders the clerk of the works, and Mr. A. W. S. Cross the architect. The total cost of the buildings was about 69,000*l*.

ADDITIONS TO OLD MILL, ALDEBURGH.

THIS is an illustration which shows how an old windmill was converted into a dwelling-house.

In the old mill a dining-room, three bedrooms, and a smoking-room were contrived, approached by a new entrance-hall and staircase. All these rooms were circular on plan. On the ground floor a parlour 30 ft. by 16 ft. was built towards the east and south, approached by a circular corridor, and on the north side of the site were erected the servants' offices. A bathroom and water-closet were arranged on the first floor. The walls were faced with rough-cast, and the roofs were tiled, except that to the old mill, which for lightness was covered with copper. The woodwork, except the doors and shutters, which were bright green, was painted white.

The contractor was Mr. G. O. Knowles, of Aldeburgh, and the architect, from whose drawing this illustration was taken, Mr. R. A. Briggs, of London.

HAILEYBURY WAR MEMORIAL.—Since the illustration of this published last week we have heard from the architect, and may add a word or two of information which we were unable to obtain before. The materials are Portland stone and bronze, the convex panels on each face of the podium being of bronze, those on the east and west sides bearing Latin inscriptions, those on the north and south sides respectively the words "South Africa" and the date. "Sursum Corda" is the school motto, and the winged heart over it the school crest. The bronze plaques above bear the names of the sixteen battles for which clasps were issued. The original idea was to put a bronze figure on the ball at the top; but this was abandoned.

The work was executed by Messrs. Farmer and Brindley, the design being, as already mentioned, that of Mr. Reginald Blomfield.

Books.

A Manual of Forest Engineering for India. By CHARLES GILBERT ROGERS, Fellow of Cooper's Hill, Deputy-Conservator of Forests, Imperial Forest Service of India. Calcutta Office of the Superintendent of Government Printing, India. 1900-1902.

TO THE ordinary architect or engineer the term "forest engineering" will scarcely convey any adequate idea of the numerous subjects which are discussed in the large and comprehensive manual issued by order of the Indian Govern nent. The first volume is devoted to building construction, the second contains information that should be found useful to all who are interested in comparatively simple engineering problems, and the third relates to matters more particularly appertaining to the duties of engineers in the forest service of India, or in countries where similar conditions prevail. The manual is divided into the following parts, viz.:—(1) Building Materials. (2) Building Construction. (3) Road Making. (4) Bridges. (5) Transport of Timber. (6) Wells. (7) Construction of Embankments and Water Channels. River Training Works. (8) Demarcation of Forests. The scope of the work was laid down in 1893 by the Board of Control of the Imperial Forest School, by whom the opinion was expressed that the general arrangement of the manual should be in conformity with the syllabus of the course of forest engineering. But it was further decided that the treatise should be elaborated beyond the actual requirements of the school curriculum, so that it might be useful for reference to the officers of the Forest Department and to the public generally. Although Mr. Rogers is the author of this work, he has to some extent occupied the position of an editor, for, being empowered to correspond with Conservators of Forests throughout India, he forwarded drafts of the different parts of the manual to various officers, inviting them to criticise the information collected, to indicate whether it was in accordance with their own practical experience, to add information where necessary, and to suggest what parts of the information were thought to be useless to forest officers or at variance with local practice. The effect of this course of action has been to make the work representative of the experience of the department as a whole, rather than of the views held by a single individual.

In considering the treatment adopted by the author, it must always be remembered that the engineering works falling to the lot of forest officers or landed proprietors in remote regions must usually be executed in the cheapest possible manner, and with the aid of somewhat primitive appliances. Further, in most cases only such materials of construction can be used as are obtainable locally, owing to the prohibitive cost of transport. This condition frequently precludes the adoption of rolled steel, iron castings, and other manufactured products. Consequently the reader will find that most of the types of construction described are those in which timber and other materials obtained on the site can be serviceably employed, while structures involving the use of iron and steel are only occasionally mentioned.

In noticing a work containing nearly a thousand pages and more than four hundred illustrations we cannot refer in much detail to the various sections, especially in view of the many different classes of work considered. Volume I. is, so to say, self-contained, being devoted entirely to "Building Materials" and "Building Construction." Part I., like all succeeding parts, is divided into sections, which are practically chapters, and are subdivided into paragraphs, numbered for convenience of reference. Sections I., II., and III. relate to stone, bricks, and tiles respectively, and the treatment adopted by the author includes features that are absent from ordinary text-books on building construction and civil engineering. Remembering that forest engineers have to quarry and otherwise prepare stone for use, the author gives detailed directions as to the most suitable methods for adoption, and adds a useful list of the available varieties of building stone found in India. Similarly, he gives full particulars of the processes of brick and tile making, including a discussion of the means to be adopted for determining the suitability of an earth for such purposes. Section IV., on "Earth, Grass, and Bamboos," is brief but interesting. When proper selection is made, earth is certainly a most suitable material for the erection of temporary buildings of small size. By choosing earth with a large proportion of clay the whole construction is practically converted into sun-dried brick, but, as recommended by Mr. Rogers, the best way of preparing the material for the erection of walls is to form sun-dried bricks, and to lay these in mud mortar, the entry of water into the top being carefully guarded against by laying one or two courses of burnt bricks at the top of the wall. Some interesting particulars are given of the manner in which the materials here mentioned are applied in different parts of India. In the central regions white earth found on the sites of old villages is said to be the best for the construction of walls, and to stand exposure to the weather for many years; while for making mud plaster the earth from ant-hills is recommended, as it is believed that white ants will never attack plaster so prepared. In Assam reeds or split bamboos are much used in conjunction with sand and lime plaster in the erection of temporary structures. In Burma bamboo is largely used in place of earth for temporary buildings, and in other parts guard huts, stables, and other structures are often built entirely of grass fastened to timber frames. Section V., entitled "Lime," is one of much importance. The sources of lime are indicated, and the process of manufacture is clearly described and illustrated. Very little space is accorded to Portland cement, for the reason that its use is considered unnecessary in India, except where great strength or rapidity of setting is required. The remaining portion of this section is occupied with applications of lime in the forms of mortar, concrete, plaster, whitewash, and distemper. Full instructions are given relative to the proportions and mixing of such compounds, and it would be difficult for anyone of ordinary intelligence to go far wrong in such matters if carefully following the directions of the author. "Timber," forming the subject of the succeeding section, is of equal importance, and is considered at some length. Although a good deal of attention is paid to points more particularly concerning those practising in India, there is much information in this section that should be appreciated by all who have occasion to make themselves familiar with the nature of wood, with the best season and methods for felling trees, and with the most approved methods of seasoning timber. The conversion of timber, the suitability of different kinds of wood for the various parts of a structure, the causes of decay, and the preservation of timber are among the other questions discussed in this excellent section of the manual, which is followed by another section descriptive of the more important timber trees to be found in different parts of the Indian empire, information that will doubtless be highly prized by forest engineers and others in that country. After Section VIII., dealing with paints and varnishes, the subject of "Carpentry and Joinery" is taken up, and, although a little out of place in Part I., it has been included therein, as the author tells us, simply for convenience of reference. Many of the joints described may be required either in the construction of floors and roofs, discussed in Part II., or in the construction of bridges, considered in Part IV., and so they could not be relegated to either of these portions of the manual. This difficulty might have been got over by constituting the section a separate part, which, although short as compared with the others, would have enabled the author to avoid the inconsistency now existing. The section itself is admirable, and its practical utility is much enhanced by the drawings with which it is illustrated. Most of the latter are reproduced to scale, and many of them include figured dimensions. But, in addition to describing various timber joints, this section contains a concise summary of some points relating to the physical properties of matter and the loads and stresses to which structural members are subjected, as well as particulars as to the design and construction of doors and windows of different kinds.

In Part II. Mr. Rogers treats of "Building Construction," commencing with foundations, and proceeding upwards to the roof. As may be anticipated, there is nothing very novel in the treatment to be found in this portion of the manual, except with regard to such points as are particularly applicable to Indian practice. In this respect the author has certainly succeeded in collecting a mass of valuable information, which is presented in an admirable manner. Moreover, the various details of a building are most thoroughly dealt with, so that this part of the work is well worthy the attention of all requiring guidance in the design of temporary or permanent buildings of simple character. In dealing with lightning conductors, the author does not emphasise so much as could be wished the desirability of establishing a complete system of protection over all parts of a building. It is true that he says the lightning conductor "should be connected with the more prominent lines of the building, such as the ridges, hips, and eaves of the roof," but he gives no directions as to the manner in which the connexion should be carried out, or as to the fitting of points, or clusters of points, along the horizontal conductors. The provision of a conductor or conductors projecting "about 5 ft. into the air from one or more of the highest points of the building," cannot be regarded as sufficient for adequate protection under all circumstances, even if we accept the theory that "a lightning conductor will afford protection over an imaginary cone having the point of the conductor for its apex and a base on the ground, the radius of which is equal to twice the height of the conductor above the ground." But, as pointed out in the report of the Lightning Rod Conference, as long ago as 1882, the rule in question cannot always be relied upon. Again, the author says:—"Lightning conductors should, where practicable, be made of copper, as that metal conducts electricity very readily." This recommendation involves unnecessary expense, and need not be followed in forest lands where the air is free from the corrosive constituents found in the atmosphere of large cities. Iron is an excellent conductor, as efficient as copper if the sectional area be properly proportioned, and it can easily be protected from corrosion by galvanising. Another very important matter, rather lightly touched upon, is the earth connexion. The ordinary earth plate is recommended in the present treatise, but there are frequently objections to this device. It is often impossible to bury the plate deep enough to insure the constant presence of moist earth, and the connexion of the conductor with the plate generally becomes impaired after the lapse of a few years.

Volume II. is devoted entirely to those prime essentials of every new country—roads and bridges. In forest lands, roads and paths are required for various purposes, such as the transportation of produce, ordinary traffic, and for the use of inspectors. The education of a forest engineer in road-making is naturally of far wider scope than that obtaining in settled countries like Great Britain, and includes the design of "fair-weather roads," "cart roads," "dragging roads," "camel roads," "bridle paths," and "inspection paths." The forest engineer must also be prepared to deal with streams crossing roads in places where bridges are not required, and to cope with various difficulties which are never encountered by road builders in civilised lands. The science of road-making is most thoroughly discussed by Mr. Rogers in Part III. of his manual, and the instructions there given cover all theoretical and practical points necessary for study. In treating of "Bridges," in Part IV., the most simple forms of construction are selected as examples, for, as a general rule, Indian forest officers are rarely required to construct bridges of large span, and, owing to the fact that forest produce is chiefly carted across the beds of torrential streams during the dry season, bridges are not often built even strongly enough to carry loaded carts. These being the prevailing conditions, the author devotes most of the present section to "simple wooden bridges" and "simple wire-rope bridges," the remainder being occupied with the description of elementary forms of the cantilever bridge and a brief discussion of masonry bridges and culverts. Those who desire more advanced teaching can easily obtain it in various engineering text-books, but it should be pointed out that these do not profess to convey the minute and practical instruction as to actual details which are to be found in the manual now before us. In Volume III. there is a very complete treatise on the "Transport of Timber and Firewood," in which are considered methods of conveying material on ordinary roads or paths, on rolling roads, sledge roads, and tramways, in specially-prepared troughs and slides, and by wire-rope ways, as well as by water. To all who are

interested in these various means of transport, we commend the careful study of the manual itself. The remaining portion of Volume III. contains adequate information relative to the construction and management of wells, the construction of dams, weirs, and water channels, the protection of river banks, and concludes with a description of the methods to be adopted for that most important branch of work—the demarcation of forests. In addition, there are six appendices to this volume relative to examples of sledge roads, forest tramways, wet slides, and wire-rope ways.

It would be difficult to conceive a more complete exposition of the many duties pertaining to the forest engineer than the present work, which, as we have already said, possesses distinct value to various sections of the community, other than that to which it is directly addressed. Although not intended as a substitute for existing text-books on civil engineering and building construction, the manual possesses a distinct sphere of usefulness, for it conveys what may be termed supplementary information, which, in many cases will enable landowners and occupiers to execute simple engineering works in places where they are compelled to rely upon their own resources. As a text-book, it will be found of much value to students, especially to such as desire to prepare themselves for constructional work abroad. From beginning to end the work gives ample evidence of the great care bestowed on the compilation and arrangement of the material, and the manner in which the task of the author has been accomplished deserves the highest commendation.

BOOKS RECEIVED.

THE ALHAMBRA. By Albert F. Calvert. (Geo. Philip and Son. 2*l.* 2s.)

TRANSACTIONS OF THE INSTITUTION OF CIVIL ENGINEERS OF IRELAND. Vol. XXX. (Dublin: John Falconer.)

THE PLUMBERS COMPANY'S DIAGRAMS; for the uses of Classes of Technical Education for Plumbers. (Published by the Plumbers' Company.)

TRADE CATALOGUES.

THE United Telpherage Company, of New York, send us two circulars describing and illustrating some applications of the "telpher" system. Strictly speaking, the word "telpherage" designates all modes of transport effected automatically by the aid of electricity, but as used by the company mentioned above it simply denotes a particular system intended for the conveyance of materials and merchandise for short distances. The first illustration in one of the circulars shows the telpher with a coke-quenching basket over the quenching tank in a gasworks; the coke is pushed from the ovens into the basket, hoisted, conveyed to the tank, quenched, and conveyed to the coke pile upon which it is dumped. All these operations are controlled from the ground level, the load being 12,000 lb., the speed of hoisting 60 ft. per minute, and the speed of conveying 800 ft. per minute. In this case the track is carried on rigid steel supports, but in an installation illustrated on the next page a wire ropeway is employed. The same circular illustrates several ingenious variants of this system, and the second circular describes an extensive plant erected in America for transporting bags of cocoa beans from a storehouse to the mill situated on the opposite side of a river. The track is supported on solidly built frames of Georgia pine, except where it crosses the river by the aid of a steel girder bridge. A train consisting of three trucks, one with a motor cab for the driver, conveys the material at an average speed of 700 ft. per minute, and performs as much work in a day as formerly required the employment of many men and teams of horses.

Messrs. R. Johnson, Clapham, and Morris, of Manchester, send us their catalogue of the Johnson-Ammon steel wire concrete lattice, which is made in rolls 6 ft. wide by 120 ft. long, or in panels or sheets to specified size. Being formed of hard steel wire, about $\frac{1}{8}$-in. diameter, this netting is extremely strong, and as it is supplied in rolls the cost of placing it in position for concrete-steel construction is small as compared with that of arranging separate rods or sheets. The lattice is quite suitable for almost all forms of concrete and plaster work. One illustration in the catalogue represents the laying of the Johnson-Ammon lattice at the Savoy Hotel extension, where it has been extensively used for the reinforcement of concrete floors.

The Lucal Light and Heating Company, of Glasgow, send us a reprint of the report made by Professor Watkinson upon their system of oil firing, as applied to a marine boiler at the Princes Dock Power Station of the Clyde Trust. Three of the Lucal patent burners were fixed in each of the two furnaces of the boiler, and the fuel used throughout was blast furnace oil, containing only 17,600 heat units per lb. It appears that the combustion was practically perfect and almost smokeless. The oil was sprayed by means of a steam jet, 0·21 lb. of steam being required for each pound of oil consumed. The average effective evaporation was 13·65 lb. per lb. of oil, which, considering the low calorific value of the fuel, the temporary and somewhat imperfect manner in which the burners were applied, and the unfamiliarity of the operators with the working of the apparatus, must be considered as an eminently satisfactory result.

Correspondence.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

SIR,—It has been found desirable to defer to a future date the Institute visit to Newcastle and the annual dinner, which were to have taken place early next month.

W. J. LOCKE (Secretary).

HAND-POWER MORTAR MILLS.

SIR,—Can any of your readers give me practical information of the utility of a *hand*-power mortar mill? Would it be of use for making mortar with furnace ashes? What is its average output?

I only want the mill for small jobs; sand is very costly to get in this district. If any reader has had practical experience with a hand-power mortar mill, any information he can give on the subject will oblige.

G. PASSMORE.

The Student's Column.

NOTES ON PORTLAND CEMENT.

CHAPTER VIII.—HARDENING AND TIME OF SETTING.

THE setting of cement is its change from a fluid to a solid state. The time taken for this change is the "time of set." Just as the composition of Portland cement is very indefinite, so the cause of this change has not been determined. By some the hardening process is supposed to be a chemical combination; others believe it to be a physical process. In reality, only two substances take part in the hardening of cement—viz., silica and lime. All the other constituents, as alumina, oxide of iron, magnesia, etc., although each playing a part in the process of hardening, strictly taken, are not capable of hydraulic action with lime.

Dr. Michaelis, in a paper read before the "Society for the Unification of Methods of Testing Technical Materials," advocated the view of a physical process. He says, "In order to gain an insight into the process of hydraulic hardening one must study first the influence of hydrate of lime on hydraulic silica, then upon alumina and oxide of iron, which three substances have been designated by the general term 'hydraulic factors.'" Dr. Michaelis's arguments were founded on the following facts:—If dried hydrate of silica be mixed at the ordinary temperature with lime paste, in a few minutes the mass is observed to coagulate and then to harden; if strongly-ignited silica be mixed with lime paste, then after a longer time, but still within twenty-four hours, the mass is seen to coagulate and gradually harden. If air-dried hydrate of alumina or ignited alumina in fine powder be mixed with lime paste, similar coagulation and hardening takes place. Lime paste treated in the same manner with finely-powdered ferric hydrate acts in the same way, but in a slight degree.

If lime-water kept saturated by suspending a piece of lime in it be allowed to act on hydraulic silica, a hard shell of hydrosilicate of lime and a soft core of hydrosilicic acid is obtained. Hydrate of alumina is acted on in a similar manner, giving hydroaluminate of lime and a core of hydrate of alumina.

With ignited ferric oxide no action takes place, but ferric hydrate forms a white crystalline substance in which the lime is only loosely held, so that it is quickly decomposed by water. Polarised light shows the hydro-silicate of lime to be a structureless mass and not crystalline. The hydro-aluminate and hydro-ferrate, however, prove to be crystalline compounds. The hydro-silicate of lime strongly resists the action of water, especially if not too rich in lime. On the other hand, hydro-aluminate of lime and hydro-ferrate are very easily softened and decomposed by water. Silica is, therefore, not only the most essential but, strictly speaking, the only constituent of cement which can be looked on as the hydraulic factor.

Lime-water enables silica, alumina, and oxide of iron to take up water of hydration, which hydrates are very rich in water. For example, silica thus treated will form a compound $5\ SiO_2\ 3\ CaO + 40\ H_2O$, which when dried over sulphuric acid will give a compound $5\ SiO_2\ 3\ CaO. + 5\ H_2O$.

Finely-pulverised alumina treated with lime-water and pressed shows a composition $5\ Al_2O_3\ 7\ CaO + 58\ H_2O$, and when dried over sulphuric acid $5\ Al_2O_3\ 7\ CaO + 23\frac{1}{2}\ H_2O$.

Lime paste consists of different hydrates, from the monohydrate to that with $8\ H_2O$.

The process which takes place, therefore, when silica, alumina, or oxide of iron and lime paste are brought together is that water of solution is taken up, producing coagulation or setting, but that possibly the silica takes up water from the higher hydrates of lime, penetrates the lime paste, and separates out monohydrate of lime. In this expanding action the silica especially must penetrate the spaces previously filled with water, and in so doing envelop the lime molecules. Through combination with water cohesion is effected, which is greater if the water is absorbed from the gelatinous polyhydrate of lime, and the fact that the stable monohydrate of lime separates out in the hydraulic hydrates or combines with them ensures solidification.

Pure clay ($Al_2O_3\ 2\ SiO_2 + 2\ H_2O$) is too stable a compound to be acted on by lime hydrate, but, if heated to cause partial dissociation, will harden hydraulically.

With Portland cement the hydraulic hardening is very much more complicated. When mixed with water the aluminate of lime sets first, and under the influence of the separated lime the process of hydration, as just explained, goes on. Cement is to be regarded as silicate of alumina decomposed by lime. The quick setting is caused by the aluminate of lime, which takes up water immediately, giving out much heat; the slow setting is caused by the hydration of the silica and lime compounds.

Dr. Michaelis says that "the setting is solely a process of water absorption; the real strengthening results first from the union of hydrate of lime with silica, brought about by surface attraction, and from the crystallising compounds of lime with alumina and oxide of iron. This process takes place gradually, in proportion to the swelling and filling up of the interstices on the part of the lime compounds formed. Hence it appears to be a necessity that the lime should be present in excess during the absorption of water, for, if the silica has only completed its hydration under the influence of lime solution, it furnishes only a soft watery mass; if, however, during its hydration it is surrounded with solid monohydrate of lime, it consolidates.

According to Zulkowski, who holds that the greater part of cement consists of metasilicate of lime, when the cement is mixed with water the metasilicate is decomposed with formation of monocalcium silicate and hydrate of lime, as shown by the equation:—

$$O = Si \lessdot \begin{matrix} OCa \\ OCa \end{matrix} \gtrdot O + H\ OH = O =$$

$$Si \lessdot \begin{matrix} O \\ O \end{matrix} \gtrdot Ca + Ca \lessdot \begin{matrix} OH \\ OH \end{matrix}$$

The hydrate of lime causes the monosilicate to swell, and the increase of volume causes bending to take place.

According to Rebuffat, the chemistry of the hardening process consists in the hydration of orthosilicate of lime with production of a body having the following composition:—$2\ (SiO_2\ 2\ CaO)\ H_2O$. Hydration of calcium aluminate at the same time takes place. The lime in combination with the orthosilicate is set free, and forms crystalline hydrate of lime. Metasilicate when present does not hydrate, but

enters into combination with the aluminate of lime, forming double compounds.

According to Le Chatelier, the structure of set cement is that of crystallised hydrate of lime in a mass of hydrated monosilicate of lime [(CaO SiO_2) 2·5 H_2O] formed from the tricalcium silicate thus :—

2 (3 CaO SiO_2) + 9 H_2O = 2 (CaO SiO_2 2·5 H_2O) + 4 Ca $(HO)_2$.

Le Chatelier also advanced the view that the phenomena of supersaturation plays an important part in the setting of cement—that is, the hydrated compounds formed on addition of water pass through a state of solution. When this solution has become supersaturated, crystallisation or setting takes place.

In reviewing the theories propounded it will be noted that the views of the different experimenters are founded on their ideas regarding the composition of cement. Le Chatelier assumes that tricalcium silicate is the chief component, Rebuffat that it is calcium orthosilicate, and Zulkowski metasilicate. For want of proof of a purely chemical process, and on the ground of failure of all attempts to prepare hydrosilicate of lime in the wet way, Michaelis inclined to the view that the hardening was more of a physical process depending on surface attraction, similar to the dyeing or tanning process.

Just as prepared animal skin precipitates tan, so hydraulically-expanded silica separates out hydrate of lime in itself, forming a hard mineral glue.

METROPOLITAN ASYLUMS BOARD.

THE first meeting after the vacation of the Managers of the Metropolitan Asylums District was held on Saturday last week at the offices of the Board, Victoria Embankment.

GORE FARM HOSPITAL.—The Hospitals Committee reported having considered reports by the engineer-in-chief on the condition of the telephone and fire alarm systems at this hospital. The reports stated that the fire alarm system at the Upper Hospital was of a somewhat crude nature, and the engineer suggested that there should be a central indicator board, and that each block should have pushes connected therewith. The cost of the work was estimated at 350*l.*, and, on the recommendation of the committee, it was agreed to carry out the necessary improvements.

DARENTH ASYLUM.—On the recommendation of the Works Committee, it was agreed to add a small scullery to the matron's new quarters at this asylum. The cost was estimated at 80*l.*

WHITE OAK SCHOOL.—Plans, prepared by the engineer-in-chief, and showing the additional storage accommodation which it is proposed to provide at this school, were adopted.

OBITUARY.

MR. JAMES SELLERS.—On the 3rd inst. Mr. James Sellers, architect, of Bury and Radcliffe, died suddenly at his residence, Sunny Mount, Radcliffe. The deceased had erected several of the public institutions of Bury.

GENERAL BUILDING NEWS.

NEW CHURCH, KILCAR, IRELAND.—The new church, which has been erected at Kilcar, was opened on the 4th inst. The building is designed in the Romanesque style. The general walling is of local freestone from Bavin Quarries, and the nave arcade is of the same stone. The church affords seating accommodation for some 1,200 persons. The nave is spanned by a timber barrel vault, which will be stained a clear malachite green and lightly varnished, the principals being picked out in cream colour for decoration. The arcade consists of six bays of circular leaded arches, carried on circular cut stone columns, with moulded bases, the capitals carved with Irish interlaced ornament. The windows are filled with lead lights in Celtic patterns, made by Messrs. Ward, of Belfast. The roofs will be covered with small, thick, rough grey-green slates from the Killaloe Quarries. A feature of the west front is the recessed entrance doorway and the three-light window over it. Messrs. Harrison, of Dublin, were the contractors for the altar rails, and Messrs. Fagan, of Dublin, for the wrought-iron work. The high altar has been executed by Messrs. P. Sheridan, of Dublin. The architects are Messrs. Doolin, Butler, and Donnelly, of Dublin, and the contractors Messrs. Campbell and Son, of Belfast.

RESTORATION OF PARISH CHURCH, ACLE, NORFOLK.—The reopening of the Acle parish church, after being restored, took place recently. The outside of the roof has been stripped and rethatched, and the underside of the roof timbers have been cladded with oak boarding, adorned with carved bosses and moulded oak ribs. The walls, windows, buttresses, and copings have been repaired, and the walls coloured inside. A carved oak pulpit on stone base has been placed on the north side of the nave. The work has been carried out from designs by, and under the superintendence of, Mr. Herbert Green, architect and diocesan surveyor, of Norwich, and the contractors have been Messrs. Chaston and Grimson, of Loddon. The fabric to the tower and north porch needs repair, and is the next work to be taken in hand. The cost of the work now completed has been about 600*l.* The estimated cost of restoring the tower is 350*l.*, and the north porch 200*l.*

NEW BAPTIST CHURCH, NEWPORT.—A new Baptist church was opened on the 1st inst. in Llanthewy-road, Newport. The building, consisting of a school-hall with classrooms, occupies a site at the corner of Spencer-road. Messrs. Habershon, Fawckner, and Co., of Newport and Cardiff, were the architects. The building is in the Early English style, and is faced with local stone and Bath stone dressings. The school-hall is 55 ft. long by 32 ft. wide, and two vestries or classrooms are provided on the same floor. The rostrum and other woodwork are in pitchpine, and under the rostrum a baptistry is provided. The windows are glazed with cathedral-tinted glass. The contract for the building amounted to 1,897*l.*, and has been executed by Mr. Charles Shapland, contractor, Maindee.

WESLEYAN CHAPEL AND SUNDAY-SCHOOL, BENTHAM, YORKSHIRE.—A new Wesleyan chapel and Sunday-school was opened recently at Bentham. The interior of the chapel has a length of 66 ft., a width of 35 ft., and a height of 36 ft. Accommodation is provided for 381 persons. There are two aisles, with an organ chamber and choir seats at the pulpit end. The schoolroom is 48 ft. long by 24 ft. 6 in., and is divided into six classrooms. The buildings have been erected from plans prepared by Mr. J. F. Curwen, architect, Kendal, and the contractors were:—Mason work, Messrs. Brassington, Settle; joiner, Mr. Brear, Morecambe; plumber, Mr. Greenop, Bentham; painter, Mr. W. Holmes, Bentham; slater, Mr. Jackman, Bentham; plasterer, Mr. Anderson, Morecambe. The cost has been 3,500*l.*

NEW SYNAGOGUE, BELFAST.—The consecration of the new synagogue at Belfast took place on the 31st ult. The building stands on a site in Annesley-street. Access is obtained to the ground floor through a vestibule with tiled floor and dado. The seats are arranged so as to face the reader's platform, which is octagonal on plan, and was formerly used in the old synagogue. Accommodation will be provided for 300 persons on the ground floor, with a gallery holding 200 in addition. Above the vestibule is a minor hall approached from the gallery staircase. A simple treatment of the early round arched style, with stone dressings sparingly introduced, has been adopted. Brick pilasters are placed between the windows. A dado of blue bricks is used along Annesley-street, and the main porch is of cut stone. The windows have leaded lights, by Messrs. Ward and Partners. The internal woodwork is principally of pitchpine varnished. Messrs. Musgrave and Co., Ltd., have installed their low-pressure system of heating. The electric lighting has been done by Messrs. Smith and Parkes. Mr. John Dowling has carried out the plumbing work. Messrs. James Henry and Son, Belfast, have carried out the contract. The architects are Messrs. Young and Mackenzie, while Mr. B. S. Jacobs, Hull, has acted as consulting architect. The cost of the work has been about 3,000*l.*

MARISCHAL COLLEGE, ABERDEEN.—The new entrance gateway of the Marischal College is being decorated with a heraldic scheme which will illustrate the history of the separate colleges and the united university. Seven coats-of-arms have been cut in simple relief in granite. In the centre of the archway is the coat-of-arms of the Aberdeen University. On the left side of it is the shield of Bishop Elphinstone, the founder and first Chancellor of King's College, the older of the two foundations, with the motto "Non confundar." On the right of the centre are the arms of George V., Earl Marischal, and his Countess, Margaret Home, the founders of Marischal College, the junior of the two foundations, of which the Earl became first Chancellor, with the motto "Veritas vincit." Above the shield is placed an earl's coronet. To the left of the Elphinstone shield are the arms of Old Aberdeen, the site of the older foundation, with the motto "Concordia res parvae crescunt." To the right of the Earl Marischal's arms are the arms of Aberdeen, the site of the younger foundation, with the motto "Bon-Accord." Then, to the left of the Old Aberdeen shield, are the arms of Lord Strathcona and Mount Royal, the present Chancellor. The coat-of-arms has a baron's coronet above it, while below is the motto "Agmina ducens." To the right of the Aberdeen shield is the coat-of-arms of the late Dr. Charles Mitchell, the greatest of recent benefactors to the university; above it an esquire's helmet, and below the motto "Spernit humum." Returning to the centre, there is the coat-of-arms of the united University of Aberdeen—quarterly, first King's College, second the Earl Marischal, third Bishop Elphinstone, and fourth Aberdeen, with the motto "Initium sapientiæ timor Domini." The whole of the interesting heraldic scheme was carried out from designs by Messrs. A. Marshall Mackenzie and Sons, architects, under the suggestions of Mr. P. J. Anderson, LL.B., librarian to the university.

PUBLIC BATHS, MANCHESTER.—Plans have been prepared by Mr. H. Price, the City Architect, for the proposed new baths which are to be erected on a site between Ashton New-road and Ashton Old-road, in the Bradford Ward, Manchester. The first-class males' swimming-bath will have a water area of 75 ft. by 30 ft. Along the gangways will be fifty-eight dressing-boxes. The second-class swimming-bath will have an area of 75 ft. by 35 ft. There will be seventy-seven dressing-boxes, and at one end of the bath there will be a dressing-room for children. Connected with each bath there will be the usual foot-baths and shower-baths. The wash-baths will be on the respective balconies, and there will be twenty-four first class and twenty-six second class. A further provision is a bicycle-room in the basement, which will be approached by means of an inclined way. There will be one swimming-bath for females, with a water area of 75 ft. by 30 ft., and fitted with sixty-five dressing-boxes and foot-baths and shower-baths. On the first floor over the entrance will be six first-class wash-baths, and on the balcony around the swimming-bath twenty-seven second-class wash-baths. To each set of wash-baths a toilet-room will be provided. The proposed buildings also include a public hall, 87 ft. by 50 ft., with seating accommodation on the ground floor for over 800 persons, and extensive platform. The gallery will seat eighty-one persons. Adjoining there will be a crush and lounge hall, 76 ft. by 21 ft. The large hall will have three extra exits at different parts. There will also be two anterooms. On the first floor there will be a room 42 ft. by 27 ft., which may be used for various purposes. A conspicuous feature of the new buildings will be a chimney 120 ft. high.

LIBRARY AND TECHNICAL INSTITUTE, BELFAST.—At the meeting of the Library and Technical Instruction Committee, held in the Town Hall, Belfast, on the 1st inst., a report was submitted by Mr. Samuel Stevenson relative to the progress of the new municipal technical institute. The following is an extract from the report:—"The contractors have now raised the building up to the level of the fourth story, and this means that they have built two storys during the past nine months, or, in other words, 20,500 super. ft. of facing. The majority of the joists of this floor are laid, and a considerable portion of the concrete, the large beams over the central hall are in their places, and the joists on, and preparations are advanced for concreting; the principals for the chemical laboratory over same are all ready, and I hope that these will be in their places and the roof covered in by Christmas. The contractors have a large portion of the stonework for the fourth story ready to set. There has been a difficulty in procuring a number of large stones for angle pilasters, but this has been got over, and a cargo of large stones is expected in a short time. I may say that I visited the quarries at Portland about this myself. The floors of all the different stories are laid with concrete, and also the staircases, and this will much shorten the completion of the building when the roof is on. The caretaker's house is completed, and the asphalte roof over same, and boiler-house, etc., are now being completed. For the past six months or so a part of the ground floor on the south side has been occupied by classes, and I expect that a much larger portion along College-square, North will be ready for classes on September 7."

NEW BANKING PREMISES, DUBLIN.—The new premises of the Northern Banking Company in Grafton-street are now nearing completion. The frontage of the building is about 63 ft., and the height of the stonework is 73 ft. The building, which will include the bank proper, manager's house, and bank chambers, is a classic design with a Corinthian order. The hall is laid with mosaic, and a stone staircase leads to the upper portion of the building. The work has been carried out by Messrs. Henry Laverty and Son, contractors, from the designs of Mr. W. H. Lynn, architect, of Belfast.

PUBLIC LIBRARY, BRANKSOME, DORSET.—The new library at Branksome was opened a short time ago. The building is situated at the corner of Shillito-road and Lake-road, on a site measuring 181 ft. by 102 ft. The exterior dimensions of the building are 69 ft. by 42 ft., and the ground around the building will be laid out as gardens. The exterior is faced with Milton brick, with Bath stone dressings, and the roof is of brown tiles. The entrance doors of panelled oak open into Lake-road. The hall, which is entered through swinging glass doors, is 66 ft. long by 26 ft. wide. The librarian's desk and enclosure faces the entrance, and on the left hand is the general reading-room, about 28 ft. square, and on the right the juniors' reading-room, 28 ft. by 16 ft., with the lending library at the rear, containing shelving for 6,000 volumes. Behind the central desk is the reference room and the librarian's room, with offices adjoining. The interior is arranged as one large hall with panelled roof, with dwarf glazed partitions, forming the separate departments. The architect was Mr. S. J. Newman, the District Surveyor, and the building has been carried out by Messrs W. E. Jones and Son, contractors, of Bournemouth.

NEW COUNCIL BUILDINGS, COWDENBEATH, N.B.—A site has been secured in High-street, Cowdenbeath, for the erection of new town council chambers. The property will have a frontage to the street of 52 ft., while the front floor will provide for the town clerk's private office and general offices, and the burgh courtroom, 29 ft. by 15 ft. Attached to the courtroom is the magistrates' apartment, while accommodation is provided for witnesses. A staircase leads from the centre of the entrance hall to the first floor, which is occupied by the council chamber, measuring 29 ft. by 22 ft. There are also offices and committee rooms. A heating chamber is situated in the basement. The front of the building will be finished in Dunfermline granite. The contractors for the various works are:—Mason, Mr. John Summerville, Cowdenbeath; joiner, Messrs. Bogie and Nicol, Kirkcaldy; plumber, Mr. Sidney Binning, Cowdenbeath; slater and plasterer, Messrs. John Paul and Sons, Cowdenbeath; tile work, Messrs Haddow, Forbes, and Co., Edinburgh; steel work, Messrs. Blayden and Co., Glasgow; glazier, Messrs. John Haxton and Co., Kirkcaldy. The architect for the work is Mr. T. Hyslop Ure, of Dunfermline.

STAINED GLASS AND DECORATION.

NEW WINDOW, WELLINGTON CHURCH.—On the 17th a new east window at this church was dedicated. It is a three-light window, with a figure of Christ in the centre light, and figures of St. John the Baptist and the Prophet Isaiah. The left light contains the New Testament saints—St. Matthew, St. Mark, St. Luke, St. Mary Magdalene, St. Elizabeth, St. Peter, St. Paul, and St. John, with the Virgin Mary, while in the right light are Old Testament figures—Aaron, Daniel, Elijah, Joshua, Jacob, David, Abraham, Noah, and Moses. The window was designed and executed at the studio of Messrs. Mayer and Co., London.

SANITARY AND ENGINEERING NEWS

THE WATER SUPPLY OF THE HARTLEPOOLS.—The Hartlepool Gas and Water Company obtained powers a year or two ago to carry out considerable works for giving additional water supply to East and West Hartlepool, and have spent 68,000*l.* on the extension of works supplying water for commercial purposes, the other portion of the work being the enlargement of the storage for the West Hartlepool domestic supply, together with an additional pumping apparatus, and a new engine and engine-house. The new storage reservoir for the trade supply, on a site at Crookfoot, has a storage capacity of 200,000,000 gallons. A five-mile conduit will convey the water to the towns. The construction of the reservoir was carried out by Messrs. W. and J. Foster, of Bingley, at a cost of about 160*l.* per million gallons. The works were designed and carried out by Mr. Charles R. Fenwick, of Leeds, Mr F. W. Sutcliffe having charge as resident engineer. For the domestic supply of West Hartlepool the bore-holes at Dyke House quarry, which are carried down into the limestone rock, give a supply sufficient not only for present requirements, but for those of a considerably increased population. By deepening the brick culverts running alongside the bore-holes, and into which the water is discharged, additional storage is provided for a quarter of a million gallons. The work could only be carried out slowly, much of it having to be done under water. The contractors were Messrs Sudron and Laycock. The new pumping engine, working at twenty-seven revolutions per minute, is capable of delivering into the storage tanks 200,000 gallons per hour, but the speed can be increased when requisite. The contractors for the whole of this apparatus were Messrs. Worth, Mackenzie, and Co., of Stockton, all the work connected with the building and foundations having been carried out by Mr. H. S. Sudron, contractor, Hartlepool. The West Hartlepool extensions were designed and carried out by the company's engineer, Mr. Thomas Bower.

FOREIGN.

FRANCE.—The Department of "Assistance Publique" has commissioned M. Roty, the celebrated artist in medal engraving, to produce a medal with on one face an allegorical group representing "La Bienfaisance confiant l'Humanité à l'Assistance Publique"; the other face to show a cartouche intended for the name and titles of the recipient of the medal.——M. Weerts, the painter, has been commissioned by the State to decorate the grand staircase of the Ecole des Ponts et Chaussées, in the Rue Saints-Pères. The scheme of decoration will include three vertical mural panels and a large ceiling panel, with allegorical figures symbolising Electricity, Navigation, Bridges, and Railways.——A new building is to be erected at Toulon for the Institute of Health there, at an estimated cost of 128,000 francs.——M. Sonnet, architect, of the town of Condé-sur-Noireau, has been commissioned to build a group of schools there, at an estimated cost of 118,000 francs.——A new Mairie is to be built at Saint-Just (Marne). M. Clement is the architect.——M. Gérand, architect, of Bordeaux, has been elected President, for 1904-1905, of the "Société des Architectes de Bordeaux et du Sud-Ouest."——The Prefecture at Quimper (Finistère) is to be rebuilt from the designs of M. Vally.——The fine Hôtel de Ville at Tours, built from the designs of M. Laloux, was formally opened on Sunday last.——M. Homolle has sent a communication to the Académie des Inscriptions to the effect that he has discovered at Delos a splendid mosaic representing Dionysos armed with a thyrsus, and riding on a tiger. The work is judged to be of the date of about 300 B.C.

GERMANY.—The new Protestant church which was consecrated on the 31st ult. at Speyer has been erected by contributions from Protestants throughout the world in memory of the protest entered by the minority of the ancient German Diet on April 19, 1529, against the repressive policy of Charles V. which had been ratified by the majority of the Reichstag. The edifice is Gothic in style, and has been built after the designs of the architects, Flügge and Nordmann, of Essen. It has a length of nearly 79 yds., while the transepts are 45·93 yds. in breadth. The interior height of the central cupola is over 78 ft., while the tower which surmounts the porch has a height of over 327 ft. The whole edifice is constructed of grey sandstone, and in the porch already mentioned is a statue of Luther trampling, Bible in hand, upon the Papal bull. In the choir are stained-glass windows, the gift of the present Emperor.——The first premium for plans for new schools at Vegesack, near Bremen, has been awarded to Herr Lang, of Geestemünde.——A number of artists in Dresden have formed a Society of Artists for the Erection of Monuments, the aim of which is to enable the architect and sculptor to work together, each performing his portion of the work in such a manner that the unity of the whole design is preserved.——The Protestant Church at Speyer, which has been in course of construction since 1890, was consecrated on August 30; the church was designed by MM. Flügge and Nordmann.——The first Great Rhineland Art Exhibition will be opened at Cologne on June 1, 1905.——A new synagogue is in course of construction at Berlin, from the designs of MM. Hoeniger and Sedelmeyer.——The Lutheran Church at Krefeld, designed by Professor Arnold in Romanesque style, is completed.——A new hospital is to be built at Munich, from the plans of Herr Schallener.

SWITZERLAND.—The ancient church of St. Martin, at Sempach, is being restored; the central aisle and the tower date from the Romanesque period, whilst the choir and other portions date from the XVIth century. On examination of the walls three different layers were discovered, each covered with paintings in the manner of its time.——The Town Hall at Bern, which has been rebuilt by Herr Vischer, was declared open on June 23.——The church at Rorschach, designed by Professor Müller, of Zurich, was consecrated on June 5.

THE TRANSVAAL.—The prevailing depression does not seem to affect materially the progress of building operations in and around Johannesburg. During the second quarter of this year the Municipal Council passed plans for buildings to the approximate value of 418,275*l.* The actual number of plans approved was 588, and represented 1,489 buildings, alterations, and additions, with accommodation for 4,043 persons. To detail the items, there were 401 dwellings, 114 additions and alterations to dwellings, 563 rooms, 132 sheds, 600 stables, and 106 shops. Johannesburg municipality, of course, takes the lead in building operations; but active work is also proceeding in the Vrededorp, Doornfontein, Bellevue, Jeppes, and Turffontein districts. For the fortnight ended July 25, 107 plans were approved. It is estimated that the buildings provided for under these plans will accommodate 575 persons, and the estimated cost is 86,000*l.*—*African Review.*

SYDNEY.—The design and tender of Messrs. J. Stewart and Co. has been accepted for a new bridge over Sydney Harbour. It will be of the cantilever type, the main span being 1,350 ft., the northern shore arm of the cantilever 580 ft. long, and the southern shore arm 500 ft. long. A trial cylinder has been sunk to a depth of 90 ft. at the site of the northern pier to test the strata below the harbour bed, with the result that it has been decided to take the foundation down to the rock, and it is proposed to form an island by filling to a short distance above high-water mark, and then to freeze the whole of the material overlying the rock, so as to form a solid and water-tight cylinder from the surface to the rock.

CYPRUS.—The new port of Famagusta is approaching completion. The work has been carried out by Messrs. Wills and Co., of Manchester, under the direction of Mr. Hobbs, resident engineer. In connexion with the port a small rail (or rather tram) way is being constructed through the length of the island, chiefly for the grain trade; but it is also hoped that the two improvements of port and tram may open the country to the outside world. Its natural beauties and archæological treasures have only to be a little better known and tourists would flock to the shores of this enchanting island. The original estimate for Famagusta Harbour, made by Messrs. Coode and Mathews in 1899, was 124,000*l.*; the railway was estimated at 130,000*l.*, but it is understood the works are being carried out now on a very much smaller scale.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. W. J. Tapper, architect, has removed from 1, Raymond-buildings, Gray's Inn, to 10, Melina-place, St. John's Wood, N.W.——Messrs. Benham and Sons are removing their showrooms from Nos. 50 and 52 to No. 66, Wigmore-street, W.

THE ST. LOUIS EXHIBITION.—From the 19th to the 25th inst. there is to be an International Congress of Arts and Science held at the St. Louis Exhibition. The organisers of the Congress desire to invite special attention to the opportunity which it offers their architects to meet and hear a great number of eminent men of learning. It is expected that more than three hundred eminent scholars of Europe and America will deliver discourses in the various departments and sections of the Congress, and that many hundred shorter communications will be made by those present.

THE RUSKIN MUSEUM, SHEFFIELD.—The annual report of the Ruskin Museum Committee states that the museum was open on 313 days during the official year, and the total number of visitors was 47,357, as against 58,325 the year before, a decrease of 10,968. This large difference is attributed to the abnormal attendance during the holidays and Coronation festivities of 1902. During the past year the special exhibition took the form of a series of examples illustrative of the art of the old Italian masters, copied by artists who had worked under Ruskin. The examples proved a great attraction, and were thoroughly appreciated by many students and visitors throughout the year. A Supplementary Catalogue with descriptive notes was issued, and two illustrated lectures were given by the curator on the collections. The museum lectures were continued during the winter months in connexion with the Free Public Lecture Scheme inaugurated two years ago. The lectures given by the curator last season were two lectures on the old Italian masters—"Florentine Painters" and "Venetian Painters"—and three lectures on the art practice of John Ruskin—"Early Drawings," "Drawings for Illustration," and "Later Drawings." The lectures were illustrated by specially prepared lantern slides of the paintings and drawings, and five hundred tickets for the series were issued during the season, the lecture room being well filled on each occasion. An additional cast of the series taken under Professor Ruskin's supervision of

the decorative work of the Acanthus Arch of St. Mark's Cathedral, Venice, has been mounted in a suitable case and placed in position in the gallery. During the year the museum buildings have been thoroughly overhauled, and are now in a state of good repair. Amongst the additions to the collections, the following are of special note:—The volumes issued to date of the Library Edition of Ruskin's works, presented by Mr. George Allen and the literary executors under the will of the late Professor Ruskin; a beautiful piece of precious opal in the matrix and a number of Ruskin plates, by Mr. George Allen; reproductions of prints in the British Museum, sent by the trustees; and the Chantry Medal in bronze, presented by Mr. Alfred Dyson, of Sheffield.

TRAMWAYS AND LIGHT RAILWAYS.—We have received the official circular for August of the Tramways and Light Railways Association. It gives a copy of an interim report on electrical machinery by the Engineering Standards Committee, and also a series of queries, answers to which will be of value to the association. Their offices are at Clun House, Surrey-street, Strand.

IMPREGNATED FELT.—Judging by samples sent to us by the manufacturers, the Patent Woollen Cloth Company, of Leeds, we believe that extensive use will be made of the material now being introduced and manufactured in this country under the name of impregnated felt. This is a cheap form of woollen felt subjected to hydraulic pressure, the surface being impregnated with a chemical preparation intended to prevent the penetration of water and grease from above, and the body of the felt with oil for the purpose of preventing the entrance of moisture from below. As we are not acquainted with the nature of the chemical and special oil employed in the preparation of the felt, it is impossible to pronounce any opinion as to its ultimate efficiency, but the physical properties of the material itself appear to be perfectly satisfactory. In this connexion we may refer to the mean results of some tests conducted by Messrs. Kirkaldy on three specimens of the felt. The original thickness was 0·74 in., which was reduced, under a gradually increased compressive load, to 0·429 in. at 300,000 lb. per sq. ft., but on the expiration of twenty-four hours after the removal of the load the thickness was found to be 0·67 in., thus giving evidence of considerable elasticity. The felt is produced in three degrees of hardness, and in different thicknesses, to suit various requirements. It may be placed under heavy machinery, girders, tramway rails, for minimising vibration; in walls and partitions, and upon floors, for reducing the conduction of sound and heat and for preventing the percolation of moisture; and used in the construction of refrigerating rooms and chambers for insulating purposes. It would be too much to expect any material impregnated with oil to possess fire-resisting properties, the absence of which militates somewhat against the universal adoption of this felt in building construction; but, even with this limitation, there are many purposes for which it may be most usefully employed.

CAERWENT EXPLORATION FUND.—The annual meeting of the subscribers to the Caerwent Exploration Fund was held on the 1st inst., Lord Tredegar presiding. Mr. Martin, the secretary, said that nearly 120*l.* had been spent, and there was now only sufficient money for three weeks' work. Mr. Swash stated that the Newport Corporation had again promised to contribute 21*l.*, and Mr. Ashby read a letter stating that the British Association had made a special grant of 15*l.* to be expended upon the exploration of the mound and of the wells, with the object of investigating, by a careful examination of the earth taken from the wells, the plant life of the Roman-British period. The museum and works were afterwards inspected, Mr. Ashby describing the recently-found inscribed stone, the large houses which are now being explored, and the very interesting south gate, the complete excavation of which is prevented by the presence of a tree. The following special grants have been received:—The Society of Antiquaries, 25*l.*; Bristol and Gloucester Archæological Association, 25*l.*; Bath Field Club, 50*l.*; Ifton Antiquarian Club, 5*l.* Monmouth and Caerleon Antiquarian Association, 25*l.*; Rhondda Naturalists' Association, 5*l.* 5*s.*; Woolhope Field Club, 2*l.* 2*s.*; and the Cardiff Naturalists' Society, 1*l.* 1*s.*

RUSSIAN TIMBER FOR THE UNITED STATES.—Mr. Consul Wardrop, writing from St. Petersburg in July last, states that the United Kingdom is Russia's best customer for timber, and Russia supplies about one-quarter of the total amount imported into the United Kingdom. The annual value of the trade is nearly 6,000,000*l.* The export from Cronstadt and St. Petersburg in 1903 was well above the average for the last ten years, and was only exceeded in 1901; more than three-fifths of it went to Hull, London, Leith, Grangemouth, and West Hartlepool; prices were, on the whole, higher than they had been for some years. From Finland the export of sawn wood is almost the same as in 1902, but there has been an enormous increase in logs and pit-props, the quantity of which has doubled. The Finnish Senate has authorised the exploitation of the forests in the extreme north of Lapland in an area of 2,500,000 hectares (about 6,200,000 acres), and it is proposed to begin by cutting down 8,000,000 to 10,000,000 trees.

NORWEGIAN STONE EXPORTS.—The export of granite from Norway was somewhat larger in 1903 than in previous years, but the prices were low. The export of hewn stone from Christiania is only an insignificant portion of the country's total export. The principal centre of the stone trade is in the southern part of Smaalen; in these quarries, however, Christiania capital is closely concerned. The value of the country's total export of granite in 1903 is estimated at something exceeding 165,270*l.*, against 137,725*l.* in 1902. Of this sum the United Kingdom is the largest contributor, whilst Germany takes less each year, owing to Swedish competition. The three principal exporting places for hewn stone are, in order, Fredrikstad, Fredrikshald, and Sarpsborg.

DANTZIG TIMBER TRADE.—The timber trade of Dantzig, Mr. Consul Brookfield reports, has not yet quite recovered from the general depression of 1901, and shippers still complain of unremunerative prices. Owing to a deficiency of water in the Vistula, supplies from Russia reached Dantzig later than usual, and thus prevented some shippers from delivering their orders at the stipulated time. In August, too, the British demand for Dantzig wood began to slacken, and stocks accumulated accordingly. On the whole, however, there was plenty of activity in the timber trade. The supply in 1901 was 315,450 loads, valued at 661,955*l.*; in 1902 it was 191,450 loads, valued at 443,680*l.*; and in 1903, 308,450 loads, valued at 700,720*l.* In another part of his report Mr. Brookfield explains that the kind of wood most in demand for the British market was oak for railway sleepers.

ARTESIAN WELLS IN ALGERIA.—The sinking of artesian wells in Algeria goes on quietly, but continuously, in the south, and the efficacy of the work is said to be gradually changing the face of the country. Where nothing grew twenty years ago are now flourishing oases, planted with date palms, bringing riches to a people who formerly lived on what they could. An account recently published by the Algerian Government contains the following information:—The total depth bored in the province of Constantine from June 1, 1856, to June 1, 1902, represents 38.702 metres (126,943 ft.), divided as follows—360 trials of a total depth of 27,919 metres gave 485 beds of ascending water and 568 beds of gushing water, delivering together 382,000 cubic metres (840,782,000 gallons) of water per twenty-four hours; 257 trials for drinking water, representing a depth of 4,904 metres, gave 138 beds of ascending water, drinkable, and twelve beds of gushing water, the total delivery per twenty-four hours being 1,200 cubic metres (4,622,100 gallons); 177 trials for ordinary wells and forty trials of the strata for the foundations of bridges gave together 229 beds of very drinkable ascending water and three beds brackish. The very successful results obtained in Algeria in places where nothing on the surface denoted the existence of underground water may, it is suggested, be useful to countries where water is not visible on the surface. The bed of water has been struck at very different depths—from 79 to 150 metres. The subterranean water contains fishes, which have been thrown up through the boring tubes—they are quite blind. Fossils of all sorts have also been thrown up.

INSANITARY HOUSES IN HULL.—According to the report of the Medical Officer of Health, twenty-nine slum dwellings were demolished in Hull last year. Systematic inspection resulted in eighty dwelling-houses being reported upon as unfit for habitation and their owners being served with statutory notices. Only about twenty of these were repaired. Of the remainder, twenty-nine have been demolished and the sites cleared, and thirty-one converted into warehouses. Only in four cases, however, were legal proceedings instituted for the compulsory closure of the property.

PAN-CELTIC CONGRESS.—On the 31st ult. Sir William Preece presided at the afternoon sectional meeting of this Congress, which was devoted to papers and discussions on Celtic costumes, customs, and folk-lore. In the course of his presidential address, on "Egyptian and Celtic Lore and Worship," Sir William Preece said that there was a remarkable connexion between the religions, language, customs, and rites of the Ancient Egyptian and those of the Ancient Briton. Tacitus mentioned the mysteries of Germany as being similar to those of Egypt and Britain. Professor Rhys had shown, in his "Celtic Britain," that the Druids were so like Egyptian magicians that an old Irish writer called Jannes and Jambres Egyptian Druids. Not much was known of Druidism, for the early Celts had no written literature. When they adopted a literature they used the Roman script. The Ogam inscriptions were comparatively modern. Cæsar, Diodorus, Strabo, Tacitus, and Pliny wrote much about the Druids, who were the priests, judges, doctors, teachers, philosophers, scientists, and magicians of the Celts. They knew astronomy. They worshipped the Supreme Being, and they made the oak His symbol. Their only temple was an oak grove, an oak tree being their holy of holies. It was regarded not only as the emblem, but as the temporary residence of God, as Moses regarded the tabernacle in the wilderness. This was essentially an Egyptian idea. Every Egyptian temple had an inner sanctuary, the holy of holies, where the Deity was supposed to reside. The Druids taught an eternal life, and, like the Egyptians, believed in the resurrection, for which they prepared. Professor Rhys had pointed out that the Celtic language was full of a pre-Aryan influence, and Professor Morris Jones had dealt ably with the pre-Aryan syntax in insular Celtic. The aborigines of Wales were probably savages, but they were ousted by the Iberians, who came there through Gaul and Spain from North Africa. The Copts and the Berbers were their survivals to-day in and near Egypt. Ethnology proved this by the shape of the skull, and philology confirmed it by the similarity of language. Ancient Egyptian agreed very closely with this pre-Celtic dialect, not only in the order of words in a sentence, the peculiar personal suffixes, the periphrastic conjugation of pronouns and propositions, the mode of word building, but in the remarkable use of letters and single syllables which had no equivalent in English and an apparent system of mutation. In many cases the coincidence was absolute. The verb in these languages came before the subject. This was not the case in any Aryan tongue. It is impossible to ignore this remarkable connexion or to resist the conclusion that Welsh and Ancient Egyptian were closely allied. The Eastern influence was seen in the formation of personal names. There was more that was Semitic in that practice than Aryan. The Aryan practice, as seen in Greek and Latin and continued in modern Europe, was quite different. Professor Rhys had said, "No evidence could well be more conclusive as to the former presence in these islands of a population of natives of non-Aryan origin." One more link—the Aryan race had been everywhere patriarchal, but the Berber and pre-Aryan race in Britain were matriarchal. The Pharaonic system of marrying one's sister led him to think that the matriarchal system existed in Egypt. When the king died in Berber or was deposed—a common occurrence—it was not his son who succeeded him, but the son of his sister. Again, the dress of the Druid and Egyptian priests were somewhat similar. Both rituals had mystic dances and arks or boats in their religious processions. The Druidical ark was a symbol of the Deluge and was undoubtedly Aryan in its origin. Like the Egyptians, who worshipped the bull, the Druids had Hu, the Royal bull, and Beuno, the ox of the ship, and both the Ancient Britons and the Egyptians worshipped the eagle and the wolf, rites which had, according to Davies, passed from Egypt, through Phrygia and Greece, into Etruria and Celtia.—*Times.*

THE SIMPLON TUNNEL.—Mr. Towsey, British Consul at Milan, in a communication to the Foreign Office, published on Monday last, observes:—"Reports from Domodossola state that 19,304 metres of the Simplon Tunnel had been pierced by August 1, that the daily progress made throughout the month of July was 6·70 metres, and that the total pierced in that month was 209 metres. On August 1, 426 metres had still to be pierced, but this had been reduced to 377 metres by August 7. Work has been suspended on the north side since last May, and has had to be carried on from the south side. It is now expected that the tunnel will be completely pierced by the middle of October, 1904, but naturally it cannot be opened to traffic before next year. The exhibition which was to have been held at Milan in 1905 to celebrate the opening of this tunnel has been postponed to 1906. Another international section has been added to those previously announced. It is described as a 'working hall for industrial arts,' and divided into the following categories:—(1)

Graphic arts and the manufacture of artistic and decorative paper; (2) artistic manufacture of metals and wood; (3) ceramic, pottery, glass; (4) textile industries and allied manufactures; (5) wallpapers. tapestry, worked and decorative leather, wall hangings, etc.; (6) industrial arts generally."

PRESERVATION OF TINTERN ABBEY.—The preservation of the east window of Tintern Abbey, which is part of a scheme for the general overhauling of the whole ruin, is now being carried out. Examination of the central shaft has shown that the stone has been so much affected by the weather that if it is taken down it is doubtful if it can be put up again. What shall be done is still under consideration, one project being to strengthen it by the addition of narrow steel bands placed close to the stonework. The other work of preservation takes the form of pointing the ashlar in many places and filling in the gaps between the masonry on the exposed summits of the walls either with cement or lead, for this will prevent the percolation of the rain. Above the east and west windows at the extremities of the nave are gables, pierced with smaller Gothic windows. These also are all being pointed, and any loose pieces of masonry will be fixed. The mullions and tracery of some of the windows to the south of the nave have been already strengthened. The work is being carried out after consultation with Mr. Waller, architect, of Gloucester.

Legal.

THE WEST-END ANCIENT LIGHT CASE.

IN the Vacation Court on Wednesday the case of Milton *v.* Maskelyne was again in the list for hearing before Mr. Justice Bigham.

On the case being called on, counsel stated that the parties were gradually coming to an agreement, and they desired that it should stand over for one week.

His Lordship acceded to the application, remarking that it was time that the case vanished from the list.

ANCIENT LIGHT DISPUTE AT HADLEY.

THE case of Scrivener and others *v.* Ager came before Mr. Justice Bigham in the Vacation Court on Wednesday on an application by the plaintiffs, the freeholders and occupier of No. 184, High-street, Hadley, near Barnet, for an interim injunction restraining the defendant until the trial from building on the site of No. 182, High-street, Hadley, so as to obstruct the light coming to an ancient window in the plaintiffs' premises.

In the result His Lordship directed that the motion should stand over until the trial, the costs being reserved.

PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.*

28,232 of 1903.—W. SHRIVELL: *An Outward Opening Casement.*

An outward opening side-hung casement provided with extended or outwardly projecting joints or hangings, which, when open, create a space or opening between casement and frame, through which the outer side is easily accessible from within.

19,102 of 1903.—G. VON PECHY: *Locks or Fastenings for Doors.*

A lock or fastening for doors adapted to be opened or closed from a distance, comprising, in combination with the usual lock case and staple plate, a latch guided by a roller projecting through a horizontal slot of the latch, an angle lever pivoted in the lock case, a horizontal stud projecting from the end of the vertical arm of the lever and engaging with a vertical slot of the latch, a weight at the end of the other arm of the angle lever, a cord attached to the same end of said lever guided over rollers to the place from which the door is to be opened, a knee-joint arm projecting from the inner surface of the weighted arm of the angle lever, a casing in the lock case above the latch, a spoon-shaped bucket, pivoted in said casing, a loose ball in said bucket, an opening in the front wall of said casing, an arm of the knee-joint projection of the angle lever reaching behind the bucket and a blade spring above the casing to press on the angle lever when it is lifted.

19,359 of 1903.—A. P. TOWL: *An Adjustable Bracket for Shelves or other purposes.*

An adjustable bracket for supporting a weight, consisting of a socket or sleeve portion adapted to embrace the whole or a part of the section of a standard, and slide thereon, and an outwardly-extending pivoted arm, which latter, at a point below the pivot, short of the elbow, is adapted to press on the surface of the standard through the medium of an interpo ed roller, block, ball, or other distance piece, and cause sufficient friction to prevent the downward movement of the bracket.

19,564 of 1903.—W. H. HOYLE and T. BARKER: *Hydraulic Appliances for Opening and Closing Gates and other Movable Structures which are acted upon by Hydraulic Rams or Pistons.*

The object of this invention is to dispense with the usual levers, connecting rods, and valves, and to substitute therefor a four-way valve with suitable inlets and outlets. In carrying this invention into effect a plug tap or valve is used with four portways, the said portways being formed in the plug at equal quarters of a circle in the periphery of the plug; the first portway leads to the second portway by a curved passage formed in the inner part of the plug or valve, thus forming a passage from the first to the second portway. A similar passage is also formed from the third portway to the fourth portway. The valve casing or valve body is formed with four ports, corresponding with the four ports in the plug.

20,438 of 1903.—E. R. FAWCETT: *Appliances for the Prevention of Hoist Accidents.*

This consists in the combination of two flaps or doors, one hinged or pivoted, to the hoist floor, and the other hinged or pivoted to the floor of the room, and placed in juxtaposition to each other.

20,504 of 1903.—W. G. HODGSON: *A Lifting Apparatus.*

A portable lifting apparatus, consisting of a wheeled frame supporting a pair of vertically-disposed tubes, one situated within the other, the inner of said tubes being adapted to be raised and lowered and maintained at any desired position, and having pivotally connected at its upper end a lifting arm, pole, or lever, provided with a hook or the like at one end, and a handle (with or without a balance weight) at the other, said lifting arm or the like having a series of holes formed therein for the object of adjustment.

20,517 of 1903.—C. MCCALLUM and J. MCGRUTHER: *Fixing of Pulleys, Electric Wires, and such like to Ceilings.*

Fixing electric wires, pulleys, and such like to ceilings, consisting in an attachment composed of an inverted dome or cup-shaped piece of metal formed with pointers and countersunk holes for fixing it to a ceiling, and having lateral or circumferential holes or apertures and a central hole for the insertion of the electric conductors for suspending an electrolier or lamp, or adapted for a pulley screw or screws in use with laundry bolts.

20,852 of 1903.—J. SOSS: *Hinges.*

A hinge comprising three parts, one of which consists of a plate having a longitudinal opening in one edge thereof and an oblong member arranged transversely therein and connected at the ends thereof with said plate, and convex in cross section on one side and plane on the other, the convex side of said member being provided at the opposite ends thereof with segmental shoulders or projections having segmental grooves in the opposite faces thereof, and said member being also provided adjacent to one edge thereof, and on the convex side thereof with lugs or projections; another part consisting of a plate provided with a longitudinal opening in one edge thereof, and with an oblong member secured therein, and said member being segmental in cross section and provided at its opposite ends and on its concave side with segmental shoulders or projections, in the opposite face of which are formed segmental grooves, said member being also provided on its concave side and near the edge thereof with lugs or projections; the other member consisting of an oblong plate segmental in cross section and thickened at both ends and provided in each end with a segmental groove, said parts being connected and adapted to turn one upon another.

21,533 of 1903.—W. PEMBERTON and J. DYSON: *Boilers for Hot Water Heating Apparatus.*

This consists in the combination with a boiler for hot water heating apparatus of a vessel containing water heated by a flue from the boiler furnace connected to an internal flue or tube, passing to and fro in the water vessel and from thence to the chimney or smoke outlet.

21,540 of 1903.—J. JACKSON: *Lifts or Elevators.*

A lift or elevator, consisting in the combination of a collapsible or folding gate, a locking and releasing device by which the starting and stopping rope is locked and released, or an electrical switch operating part is locked and released, said locking or releasing part being connected with and operated by one of the vertically moving parts of the gate at the back or fixed portion thereof.

21,692 of 1903.—J. N. RUSSELL: *Hot Water Circulation Apparatus.*

A hot water circulation apparatus, consisting in introducing air or other equivalent gaseous fluid under pressure into the water in the ascension pipe leading to the top tank, for the purpose of accelerating the upward flow of water in said pipe.

22,450 of 1903.—TONKS, LTD., and W. SPARKS: *Casement Stays.*

A casement stay, the said casement stay consisting essentially of a slotted plate on the hinged casement frame, the upper part of the slot of which plate has in it a series of seats or recesses for a fastening gravity bolt or knob on a pin on the pivot stay or casement arm to engage with and thereby lock or fasten the arm where the locking or fastening bolt or knob is actuated by gravity alone or by gravity supplemented by the pressure of a spring.

26,731 of 1903.—J. W. RICE: *A Portable Platform.*

This invention relates to a portable platform for the use of painters and others, and is carried into effect in the following manner:—A board is provided having about one-third of its length of greater width than the other two-thirds, the wider part forming the actual platform. In the narrower part two slots are provided in which run two balls connected above the board by a strap and below the board by a cross-bar having two downward pointing rods, wing or fly nuts being provided on the balls to enable them to be retained at any part of the slots. Below the front end of the actual platform is hinged one end of a three-sided strut, in such a manner that the inner end of the strut will be considerably below the inner end of the platform when the strut is opened, by straightening tie-bars having a rule joint in the centre of their lengths and having one end hinged to the strut and the other to the actual platform.

10,575 of 1904.—G. R. WILEHART: *A Valve for Wash-hand Basins.*

A device comprising a basin provided with a discharge port, having vertically arranged recesses and a shoulder, a bushing provided with a flange adapted to rest upon the shoulder to support the bushing and to form a valve seat, vertically arranged ribs on the bushing to engage the recesses to prevent the bushing from turning, a frame extending across the bushing at a point adjacent its lower end and adapted to prevent the passage of foreign matter through the bushing, a screw-threaded stem centrally and vertically arranged upon the frame, a disc-shaped valve adapted to engage the flange to close the discharge port, a sleeve depending from the underside of the valve and adapted to receive the stem, and a lever conforming to the contour of the interior of the basin and secured to the valve.

11,995 of 1904.—A. ZAHN: *Adjustable Combined School Desks and Forms.*

An adjustable form comprising, in combination with the usual uprights, a desk, a back, a shelf, a seat, and a connecting beam, one end of which is fixed in the frame of the upright, the other end being adjustably guided in a guide piece fixed on the lower surface of the seat, a screw-bolt downwardly projecting from the seat through a longitudinal slot of the connecting beam, and a thumb-nut on the lower end of the screw-bolt for securing the beam in its position with regard to the seat.

14,011 of 1904.—C. MCCALLUM and W. STEWART: *Portable Attachment of "Wrenchers" and like Appliances to Baths and the like.*

This relates to the attachment of "wrenchers" and the like to baths and the like, consisting of a metal bracket mounted on a wall bracket above the bath by which a piece of wood is supported and clamped rigidly in position for the accommodation and support of said "wrencher," in combination with a semi-ring-shaped piece of metal for attaching the piece of wood to the bath at its opposite end.

14,375 of 1904.—D. F. HENRY, JUNIOR: *Delivery Devices for Tile and like Moulding Machines.*

This consists in the combination of rotatable tile-turning mechanism, a palette carried thereby and adapted to support the tile when turned, a movable palette receiving support having position normally in the path of the turning mechanism, means for retracting the support, and means for returning the same to palette receiving position.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

14,471 of 1904.—H. S. HALE: *Combination of Bath, Lavatory Basin, Flushing Cistern, and Water Closet.*

This consists in the combination with a basin of a fixed flushing tank below said basin, and into which the same is adapted to discharge, a water closet below and connected with said tank, a common supply pipe and connexions between the same and said basin and tank, and a valve in the connexion between said pipe and tank.

15,050 of 1904.—P. RUSCHEWEYH: *Chimney-tops and the like.*

A chimney-top characterised by the upper cowl being constituted by two parts, between which are arranged the weathercock and the bearing rod guide, and which are connected by screws, the lower cowl being secured to the said upper cowl, on the one hand, by means of lateral screws, and, on the other hand, by means of a retaining piece mounted on the upper cowl and having a wide head, and in which the suction cone is constituted by several separate plates, the bent flanges of which as wind guide surfaces are detachably secured together, the plates or the lower extension of the chimney-top being detachably secured to the suction cone plates by means of screws, for the purpose of enabling the chimney-top to be easily taken to pieces and erected.

15,102 of 1904.—W. R. LESTER: *Glazing Bars or Astragals for Roof Lights and Windows.*

A glazing bar or astragal, consisting of a central core of inverted T-form, and having a vertical and a more or less horizontal member, steps upon the horizontal member, and a sheath enclosing the core, and having lips projecting upwards from the edges of the steps, and from the edges of the horizontal member.

20,650 of 1903.—J. PERRY: *Construction of Wells and Cesspools.*

This invention consists in lining the walls of wells for spring water and dumb wells or cesspools with earthenware pipes impermeable to water, in place of brickwork, which, as is well known, permits surface water and drainings to percolate into the well.

20,568 of 1903.—J. G. CONDE (A. FERNANDEZ): *Framework and Ventilating Devices for Tunnels, Shafts, Mines, or the like.*

An arrangement for lining the walls of tunnels, shafts, mines, and the like, comprising a series of frames connected together at intervals apart by longitudinal braces and corrugated plates, the latter preferably arched somewhat, in combination or not as desired with a cross girder or brace near the top of each frame for bracing the two side pieces together, and a legging for separating the space above from the space below this brace, so that the space above acts as a longitudinal ventilating shaft.

21,624 of 1903.—J. W. BROWN: *A Flood Gully and Weir Chamber Combined.*

This relates to means for carrying off storm water and preventing flooding, consisting of the usual or suitable gully furnished with a weir chamber, in combination with a weir, into which the water and obstruction are thrown by a grate surface suitably inclined towards the kerb.

15,181 of 1904.—P. STEENBOCK: *Manufacture of a Material Designed for the Production of Cement.*

A process of manufacturing a material designed for the production of cement, consisting in mixing beryllium compounds, difficultly soluble in water, and reacting with or decomposable by phosphoric acids or their acid salts, with like compounds of light metals, including zinc.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

August 24.—FRANK S. PARSONS (at Shipston-on-Stour).

Tredington, Worcester.—Freehold farm, 211 a. 3 r. 39 p. £1,820

August 26.—WYATT & SON (at Bognor).

Bognor, Sussex.—Albert-rd., "Seacroft," f., y.r. 60*l.* 1,075

Gloucester-rd., corner plot of land, f..... 255

MADDISON, MILES, & MADDISON (at Gorleston).

Gorleston, Suffolk.—73 and 74, Cliff-hill, f., y.r. 28*l.* 360

41, Springfield-rd., f., p..... 330

Beach-rd., corner plot of land, f..... 103

August 31.—FRANCIS DOD & CO.

Canonbury.—26, Canonbury-sq., u.t. 14 yrs., g.r. 7*l.* 4s., e.r. 50*l.*..... 245

Hackney.—30 and 32, Tower-st., f., w.r. 89*l.* 14s..... 550

Tottenham.—269, High-rd., u.t. 72 yrs., g.r. 8*l.* 8s., y.r. 36*l.* 310

ROBERT TIDEY & SON.

Clerkenwell.—Myddelton-st., a profit rental of 125*l.* 10s. for 7 yrs. 160

De Beauvoir Town.—9, Ardleigh-rd., u.t. 19½ yrs., g.r. 5*l.*, y.r. 36*l.* 255

De Beauvoir Town.—20 and 22, Balmes-rd., u.t. 22 yrs., g.r. 7*l.* 10s., y.r. 77*l.*..... £555

Hoxton.—56 and 58, De Beauvoir-cres., u.t. 22½ yrs., g.r. 6*l.* 6s., y.r. 84*l.* 18s..... 425

WYATT & SON (at Chichester).

Oving, Sussex.—Freehold house and meadow, 1 a. 0 r. 34 p. 310

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; g.r. for grove; b.h. for beerhouse; p.h. for public-house; o. for offices; s. for shops; ct. for court.

MEETINGS.

MONDAY, SEPTEMBER 12.

Institute of Sanitary Engineers.—Meeting of Organising Committee, 3 p.m. Examination and Literary Committee, 5 p.m.

SATURDAY, SEPTEMBER 17.

Institute of Sanitary Engineers.—Visit to the Reading Waterworks.

Architectural Association.—Week-end visit to Kettering and district.

Northern Architectural Association.—Visit to South Shields.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, manuscripts, or other documents, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.			
Hard Stocks.	1	16	0	per 1000	alongside,	in river.
Rough Stocks and Grizzles	1	13	0	,,	,,	,,
Facing Stocks ...	2	12	0	,,	,,	,,
Shippers	2	10	0	,,	,,	,,
Flettons	1	10	0	,,	at railway	depôt.
Red Wire Cuts ...	1	13	0	,,	,,	,,
Best Fareham Red	3	12	0	,,	,,	,,
Best Red Pressed Ruabon Facing	5	0	0	,,	,,	,,
Best Blue Pressed Staffordshire ...	4	4	0	,,	,,	,,
Do. Bullnose	4	10	0	,,	,,	,,
Best Stourbridge Fire Bricks.....	4	8	0	,,	,,	,,
GLAZED BRICKS.						
Best White and Ivory Glazed Stretchers	13	0	0	,,	,,	,,
Headers	12	0	0	,,	,,	,,
Quoins, Bullnose, and Flats.....	17	0	0	,,	,,	,,
Double Stretchers	19	0	0	,,	,,	,,
Double Headers...	16	0	0	,,	,,	,,
One Side and two Ends	19	0	0	,,	,,	,,
Two Sides and one End	20	0	0	,,	,,	,,
Splays, Chamferred, Squints	20	0	0	,,	,,	,,
Best Dipped Salt Glazed Stretchers, and Header	12	0	0	,,	,,	,,
Quoins, Bullnose, and Flats.....	14	0	0	,,	,,	,,
Double Stretchers	15	0	0	,,	,,	,,
Double Headers...	14	0	0	,,	,,	,,
One Side and two Ends	15	0	0	,,	,,	,,
Two Sides and one End	15	0	0	,,	,,	,,
Splays, Chamferred, Squints	14	0	0	,,	,,	,,
Second Quality White and Dipped Salt Glazed	2	0	0	,,	less than best.	

BRICKS, &c.—(*continued*).

	s.	d.		
Thames and Pit Sand.....	7	3	per yard,	delivered.
Thames Ballast.....	6	0	,,	,,
Best Portland Cement	30	0	per ton,	,,
Best Ground Blue Lias Lime	21	0	,,	,,

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime.....12s. 0d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 6d. per ton at rly. dpt.

STONE.

	s.	d.		
BATH STONE—delivered on road waggons, Paddington Depôt	1	6½	per ft. cube.	
Do. do. delivered on road waggons, Nine Elms Depôt	1	8½	,,	,,
PORTLAND STONE (20 ft. average)—Brown Whitbed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf...	2	1	,,	,,
White Basebed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf...	2	2½	,,	,,

	s.	d.		
Ancaster in blocks	1	11	per ft. cube,	deld. rly. depôt.
Beer ,, ...	1	6	,,	,,
Greenshill ,, ...	1	10	,,	,,
Darley Dale in blocks...	2	4	,,	,,
Red Corsehill ,,	2	5	,,	,,
CloseburnRedFreestone	2	0	,,	,,
Red Mansfield ,,	2	4	,,	,,

YORK STONE—*Robin Hood Quality.*

Scappled random blocks	2	10	,,	,,
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	3	per ft. super.	,,
6 in. rubbed two sides ditto, ditto	2	6	,,	,,
3 in. sawn two sides slabs (random sizes)	0	11½	,,	,,
2 in. to 2½ in. sawn one side slabs (random sizes)	0	7½	,,	,,
1½ in. to 2 in. ditto, ditto	0	6	,,	,,

HARD YORK—

Scappled random blocks	3	0	per ft. cube,	,,
6 in. sawn two sides, landings to sizes (under 40 ft. super.)	2	8	per ft. super.	,,
6 in. rubbed two sides ditto	3	0	,,	,,
3 in. sawn two sides (slabs random sizes)	1	2	,,	,,
2 in. self-faced random flags	0	5	,,	,,
Hopton Wood (Hard Bed) in blocks	2	3	per ft. cube. deld. rly. depôt.	
,, ,, ,, 6 in. sawn both sides landings	2	7	per ft. super. deld. rly. depôt.	
,, ,, ,, 3 in. do.	1	2½	,,	,,

SLATES.

in.	in.	£	s.	d.		
20 × 10	best blue Bangor	13	2	6	per 1000 of 1200 at r. d.	
20 × 12	,, ,,	13	17	6	,,	,,
20 × 10	first quality ,,	13	0	0	,,	,,
20 × 12	,, ,, ,,	13	15	0	,,	,,
16 × 8	,, ,, ,,	7	5	0	,,	,,
20 × 10	best blue Portmadoc	12	12	6	,,	,,
16 × 8	,, ,,	6	12	6	,,	,,
20 × 10	best Eureka unfading green .	15	17	6	,,	,,
20 × 12	,, ,,	18	7	6	,,	,,
18 × 10	,, ,,	13	5	0	,,	,,
16 × 8	,, ,,	10	5	0	,,	,,
20 × 10	permanent green	11	12	6	,,	,,
18 × 10	,, ,,	9	12	6	,,	,,
16 × 8	,, ,,	6	12	6	,,	,,

TILES.

	s.	d.		
Best plain red roofing tiles .	42	0	per 1000 at rly.	depôt.
Hip and Valley tiles ...	3	7	per doz.	,, ,,
Best Brosely tiles.....	50	0	per 1000	,, ,,
Do. Ornamental tiles	52	6	,,	,, ,,
Hip and Valley tiles ...	4	0	per doz.	,, ,,
Best Ruabon red, brown, or brindled do. (Edwards)	57	6	per 1000	,, ,,
Do. Ornamental do	60	0	,,	,, ,,
Hip tiles	4	0	per doz.	,, ,,
Valley tiles	3	0	,,	,, ,,
Best Red or Mottled Staffordshire do. (Peakes).....	51	9	per 1000	,, ,,
Do. Ornamental do.....	54	6	,,	,, ,,
Hip tiles	4	1	per doz.	,, ,,
Valley tiles	3	8	,,	,, ,,
Best "Rosemary" brand plain tiles.....	48	0	per 1000	,, ,,
Best Ornamental tiles	50	0	,,	,, ,,
Hip tiles	4	0	per doz.	,, ,,
Valley tiles	3	8	,,	,, ,,
Best "Hartshill" brand plain tiles, sand faced.	50	0	per 1000	,, ,,
Do. pressed.....	47	6	,,	,, ,,
Do. Ornamental do	50	0	,,	,, ,,
Hip tiles	4	0	per doz.	,, ,,
Valley tiles	3	6	,,	,, ,,

WOOD.

	At per standard.					
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in	£	s.	d.	£	s.	d.
	15	10	0	16	10	0
Deals: best 3 by 4.....	14	10	0	15	10	0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11	10	0	12	10	0
Battens: best 2½ by 6 and 3 by 6 ..	0	10	0	less than 7 in. and 8 in.		

PRICES CURRENT.—*Continued on page 283.*

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Required.	Premiums.	Designs to be Delivered
New Technical Schools, Kingstown	Kingstown (Ireland) U.D.C.	Not stated	Sept. 14
Public Library Building	Benwell and Fenham U.D.C.	75*l.*, 40*l.*, and 25*l.*	Sept. 30
New School, Poulton	Wallasey Education Committee	Not Stated	do.
New Buildings at Workhouse, Hillingdon East	Uxbridge Guardians	Not Stated	Oct. 1
New Public Offices	Wallasey U.D.C.	250*l.*, 75*l.*, and 50*l.*	Oct. 31

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tenders, etc., supplied by	Tenders to be Delivered
Making-up of York-road	Felixstowe and Walton U.D.C.	Surveyor, Town Hall, Felixstowe	Sept. 12
Alters. & Additions to Wesleyan Ch., Machen, Mon.	The Trustees	F. G. Webb, Architect, Holly Bush, Lower Machen, Mon.	do.
Free Library Building	Sevenoaks U.D.C.	E. Evans Cronk, Architect, Sevenoaks	do.
Alterations to Tintern National School	The Managers	W. H. Dashwood Caple, Architect, Cardiff	do.
Sewage Disposal Works	Hanwell U.D.C.	Council's Surveyor, Hanwell	do.
Public Library	do.	do.	do.
Sewering, Drng., Pav., etc., Limebank-st., Manchester	Manchester Corporation	Surveyor's Office, Town Hall, Manchester	do.
Sewerg., Drng., Pav., etc., Stamford-rd., S. Manchester	do.	do.	do.
Draining, Pav., etc., Nash-st., Ardwick, S. Manchester	do.	do.	do.
Draining, Pav., etc., Morna-st., Ardwick, S. Manchester	do.	do.	do.
Draining, Pav., etc., Charlestown-rd., N. Manchester	do.	do.	do.
Drng., Pav., etc., Portland-rd., Rusholme, S. Manchester	do.	do.	do.
Drng., Pav. etc., Cedar-gr., Fallowfield, S. Manchester	do.	do.	do.
Drng., Pav., etc., Thorn-gr., Fallowfield, S. Manchester	do.	do.	do.
Sewering, etc., Fenton-st., W. Gorton, S. Manchester	do.	do.	do.
Broken Granite and Flints	Sunbury-on-Thames U.D.C.	Council's Surveyor, Sunbury-on-Thames	do.
*Erection of Chimney Shaft	Torquay Town Council	Borough Engineer, Town Hall-chambers, Torquay	do.
Painting Ironwork of Bridges	Shrewsbury Improvement Com...	Borough Surveyor, The Square, Shrewsbury	Sept. 13
Street Repairs	do.	do.	do.
Electrical Equipment of Tramways	West Ham Borough Council	Borough Electrical Engineer, Electricity Works, Canning Town, E.	do.
Furniture for Monega-road Board School	East Ham Education Committee ..	Secretary, Education Office, East Ham, E.	do.
Cookery Centre and Additional Staircase	do.	R. L. Curtis, Architect, 11 and 12, Finsbury-square, E.C.	do.
Erection of Pumping Station, etc., at Warley	Oldbury U.D C.	Council's Engineer, 39, Corporation-street, Birmingham	do.
Widening of Warrington Bridge	Warrington Corporation	J. J. Webster, Engineer, 39, Victoria-street, S.W.	do.
Library, Public Offices, and Assembly Hall	Ilkley U.D.C.	W. Bakewell, Architect, 38, Park-square, Leeds	do.
Erect. of Twenty-three Cottages, Hull and Selby Rly.	North-Eastern Railway	W. Bell, Company's Architect, York	Sept. 14
Addns. & Alters. to Parcels Office, Harrogate Station	do.	do.	do.
Painting Infectious Diseases Hospital, Warrington..	Warrington Borough Council	Borough Surveyor, Town Hall, Warrington	do.
Erection of Shelter Hall	Hove Corporation	Borough Surveyor, Town Hall, Hove	do.
Pumping Sta., Steel Water Tanks, Gas Engine, etc.	Rhondda U.D.C.	Council's Engineer, Gas Offices, Pentre, Glamorgan	Sept. 15
Construction of Propagating Pit House	Lewisham Cemeteries Committee ..	Surveyor, Town Hall, Catford, S.E.	do.
Road Materials, Team Labour, Ironmongery, etc. ..	Maldens and Coombes U.D.C.	Council's Surveyor, New Malden	do.
Painting Labourers' Dwellings, Ancoats	Manchester Sanitary Committee ..	City Architect, Town Hall, Manchester	do.
Making Trial Holes	Dublin Corporation	City Engineer, City Hall, Dublin	Sept. 16
Iron Railing for Ramparts	Lancaster Corporation	Borough Surveyor, Town Hall, Lancaster	do.
Erect. Fmhse., Alters., etc., Fm. Bldgs., Walla & Cylla	.....	Sampson Hill, Architect, Green-lane, Redruth	Sept. 17
Sewage Disposal Works	Worsley U.D.C.	J. A. Corson, District Offices, Walkden	do.
Erection of Schoolroom, Aberbargoed, Mon.	Monmouthshire Calvanistics Com...	G. Kenshole, Architect, Bargoed	do.
Sewage Disposal Works	Penistone U.D.C.	Spinks & Pilling, Engineers, 20, Park-row, Leeds	do.
New Tower, etc., to St. Thomas's Ch., St. Annes-on-Sea	.....	Austin & Paley, Architects, Lancaster	Sept. 19
Caretaker's Apartments, Nunhead Library	Camberwell Borough Council	Borough Engineer, Town Hall, Camberwell	do.
Two Additional Cottage Homes at Marston Green ..	Birmingham Guardians	C. Whitwell & Son, Architects, 23, Temple-row, Birmingham	do.
Jarrah Wood Paving	Finsbury Borough Council	Borough Surveyor, Finsbury Town Hall, Rosebery-avenue, E.C.	do.
Tar Paving and Re-setting Kerb and Channel	Stevenage U.D.C.	Council's Office, Stevenage	do.
Repairs to Floating Stage, Seacombe Ferry	Wallasey U.D.C.	Ferries Manager, Egremont Ferry, Cheshire	do.
Street Works, Belvedere	Erith U.D.C.	Council's Surveyor, Bexley-road, Erith	do.
New Northern District Post Office, Liverpool	Commissioners of H.M. Works, etc.	Mr. Cropper, G.P.O., Leeds	Sept. 20
Construction of Light Railways	Barking Town U.D.C.	Hawtayne & Zeden, 9, Queen-street-place, E.C.	do.
Deep-Bored Well and Catchment at Pumping Station	Scunthorpe U.D.C.	Council's Engineer, Scunthorpe, viâ Doncaster	do.
Drainage, etc., London-road Improvement Scheme..	Barking Town U.D.C.	Council's Surveyor, Public Offices, Barking	do.
*Reconstruc. Bdge. over Grand Junc. Canal at Acton-la.	Willesden D.C.	Gordon Thomas, 21, Surrey-street, Strand, W.C.	do.
*Sewer Works in Waxlow-road, Harlesden	do.	O. Claude Robson, M.I.C.E., Public Offices, Dyne-rd., Kilburn, N.W.	do.
*R'dm'k'g, Works, S. Approach-rd., Acton-la., Willesden	do	do.	do.
Construction and Fitting-up of Conveniences	Blackpool Corporation	Borough Engineer, Town Hall, Blackpool	Sept. 21
*Road Paving Works in Gt. Church-lane	Borough of Hammersmith	Borough Surveyor, Town Hall, Broadway, Hammersmith	do.
*Iron Fencing at School, Swanley, Kent	Metropolitan Asylums Board	Office of the Board, Embankment, E.C.	do.
*Erection of Laundry Building	Woolwich Guardians	C. W. Brooks, 63, Finsbury-pavement, E.C.	do.
*Levelling and Tar Paving Playgrounds of Schools ..	Barking Town Education Committee	C. J. Dawson, Architect, East-street, Barking	do.
Wrought-Iron Fencing	Darlington Corporation	Borough Surveyor, Town Hall, Darlington	Sept. 22
Elec. Generating and Battery Rooms, etc., at Asylum	Monmouthshire Asylum Committee	E. A. Johnson, Architect, St. Mary's-chambers, Abergavenny	do.
Drainage Work, Withington Workhouse	Chorlton Union	F. C. Lynde, Engineer, King-street, Manchester	do.
Broken Granite	Romford U.D.C.	Council's Surveyor, Council Offices, Romford	do.
Forage Preparing Plant	Ilford U.D.C.	Council's Engineer, Town Hall, Ilford	do.
Firewood Boards	Greenwich Union	Union Offices, Greenwich	do.
Guernsey Granite Spalls	do.	do.	do.
*New Coastguard Buildings, Dymchurch, Kent	Admiralty	Director of Works Department, 21, Northumberland-avenue, W.C.	Sept. 23
*New Coastguards Buildings, near Lands End	do.	Superintending Civil Engineer, H.M. Dockyard, Devonport	do.
Extension of Water Service	Stroud Water Co.	Manager, John-street, Stroud	Sept. 24
Steel Rolled Joist Gearing	River Wear Commissioners	H. H. Wake, Engineer, Commissioner's Quay, Sunderland	Sept. 26
*Additions to Water Tower, New Water Tank, etc...	Witney U.D.C.	Stevenson & Burstal, 38, Parliament-street, S.W.	do.
*Making-up Westbourne-road	Beckenham U.D.C.	Council's Surveyor, Beckenham	do.
*Isolation Hosp., Deadman's-la., Gt. Dunmow, Essex	Dunmow R.D.C.	R. Curtis & Son, 11 and 12, Finsbury-square, E.C.	do.
New Public Elementary School	Kingston-on-Thames Educa. Com.	F. W. Roper, Architect, 9, Adam-street, Adelphi, W.C.	do.
*Heating and Lighting at Highlands Schools	Ilford U.D.C. Education Committee	C. J. Dawson, Architect, 11, Cranbrook-road, Ilford	do.
*Levelling and Tar Paving Playgrounds	do.	do.	do.
*Supply of School Furniture	do.	do.	do.
Restor., Alters., etc. Market Hall & Assembly Rooms	Llangollen U.D.C.	Urban District Surveyor, Llangollen	Sept. 27
*Making-up Roads	Tottenham U.D.C.	Council's Engineer, 712, High-road, Tottenham	do.
*New Sorting Office, Holbeck, Leeds	Commissioners of H.M. Works, etc.	H. G. Nixon, H.M. Office of Works, Leeds	do.
Municipal Buildings, Leigh	Leigh (Lanc.) Corporation	J. C. Prestwich, Architect, Bradshawgate-chambers, Leigh	Sept. 28
*New Chapel at Edmonton Workhouse	Edmonton Union	T. E. Knightly, 106, Cannon-street, E.C.	do.
Sewerage and Sewage Disposal Works	Cudworth U.D.C.	Fairbank & Son, C.E., Lendal-chambers, York	Sept. 30
*New Coastguard Buildings at Polman, near Fowey..	Admiralty	Superintending Civil Engineer, H.M. Dockyard, Devonport	do.
Reconstruction of Mitre Bridge, Grand Junction Canal	London C.C.	Council's Chief Engineer, County Hall, Spring-gardens, S.W.	Oct. 4
Construction of Sewer, Notting Hill	do.	do.	do.
Conden., Wat. Pipes, Supports, Valves, etc., Greenw'h	do.	do.	do.
Sewering and Concreting Footway	Leiston-cum-Sizewell U.D.C.	Council's Surveyor, Snape-road, Leiston	do.
Construction of Timber Jetty, Cladnageragh	Board of Public Works, Dublin	Office of Public Works, Dublin	Oct. 7
Extension of Lerwick Harbour	Lerwick Harbour Trustees	J. Barron, Esq., 216, Union-street, Aberdeen	Oct 12
Eight Small Dwelling Houses, Heeley	Sheffield Brick Co., Ltd.	W. G. Buck, Architect, 4, East Parade, Sheffield	No date.
Alterations to Banking Premises, Wigton	Carlisle and Cumberland Banking Co.	J. H. Martindale, Architect, Wigton	do.
Supplying and Laying Stoneware Pipes	Selby U.D.C.	Council's Surveyor, Town Hall, Selby	do.
1,000 Fencing Posts	.....	Estate Office, St. Michael's Mount, Marazion, R.S.O.	do.
Elec. Sub-Station and Subways for Elec. Cables, etc.	Leeds Union	T. Winn & Sons, Architect, 92, Albion-street, Leeds	do.
Wiring Instal., Subway, & Undergd. Concentric Mains	do.	do.	do.
Construction of Pier, etc.	Board of Public Works, Dublin	Office of Public Works, Dublin	do.
*Exten. of Queen's Jubilee Hospital, Earl's Court, S.W.	The Committee	Secretary at Hospital, Richmond-road, Earl's Court, S.W.	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
Surveyor and Engineer	Gainsborough U.D.C.	250*l.*	Sept. 14
*Chief Draughtsman	Perak Government (Malay States)	360*l.*, etc.	Sept. 15
County Surveyor of Highways	Berks County Council	500*l.*, etc.	Sept. 16
*Tunnel Foreman	Ceylon Government Railways	300*l.* per annum	Sept. 17
Clerk of Works	Sunderland Corporation	4*l.* 10s. per week	Sept. 21
*Quantity Surveyor	Acton U.D. Education Committee	1 per cent. on amount of tender accepted	do.
*Building Inspector	Wood Green District Council	3*l.* 3s. per week	do.
*Assistant-Instructor in Manual Training	Battersea Polytechnic	100*l.*	No date.

Those marked with an asterisk (*) are advertised in this Number. *Competitions*, —. *Contracts*, lv. vi. viii. x. *Public Appointments*, xvi.

PRICES CURRENT.—*Continued from page* 281.

WOOD (*continued*).

	At per standard. £ s. d.		£ s. d.
Deals: seconds	1 0 0	less than best	
Battens: seconds	0 10 0	" " "	
2 in. by 4 in. and 2 in. by 6 in.	9 0 0		9 10 0
2 in. by 4½ in. and 2 in. by 5 in.	8 10 0		9 10 0
Foreign Sawn Boards—			
1 in. and 1¼ in. by 7 in.	0 10 0	more than battens.	
¾ in.	1 0 0	"	
	At per load of 50 ft.		
Fir timber: best middling Danzig or Memel (average specification)	4 10 0		5 0 0
Seconds	4 5 0		4 10 0
Small timber (8 in. to 10 in.)	3 12 6		3 15 0
Small timber (6 in. to 8 in.)	3 0 0		3 10 0
Swedish balks	2 15 0		3 0 0
Pitch-pine timber (30 ft. average)	3 5 0		3 15 0

JOINERS' WOOD.

	At per standard.		
White Sea: first yellow deals, 3 in. by 11 in	23 0 0		24 0 0
3 in. by 9 in.	21 0 0		22 10 0
Battens, 2½ in. and 3 in. by 7 in.	17 0 0		18 10 0
Second yellow deals, 3 in. by 11 in.	18 10 0		20 0 0
" " 3 in. by 9 in.	17 10 0		19 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0		14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	15 10 0		16 10 0
Battens, 2½ in. and 3 in. by 7 in.	11 10 0		12 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	21 0 0		22 10 0
Do. 3 in. by 9 in.	18 0 0		19 10 0
Battens	13 10 0		15 0 0
Second yellow deals, 3 in. by 11 in.	16 0 0		17 0 0
Do. 3 in. by 9 in.	14 10 0		16 0 0
Battens	11 0 0		12 10 0
Third yellow deals, 3 in. by 11 in.	13 10 0		14 0 0
Do. 3 in. by 9 in.	13 0 0		14 0 0
Battens	10 0 0		11 0 0
White Sea and Petersburg :—			
First white deals, 3 in. by 11 in.	14 10 0		15 10 0
" " 3 in. by 9 in.	13 10 0		14 10 0
Battens	11 0 0		12 0 0
Second white deals, 3 in. by 11 in.	13 10 0		14 10 0
" " 3 in. by 9 in.	12 10 0		13 10 0
" " battens	9 10 0		10 10 0
Pitch-pine: deals	16 10 0		20 0 0
Under 2 in. thick extra	0 10 0		1 0 0
Yellow Pine—First, regular sizes	40 0 0	upwards.	
Oddments	28 0 0	"	
Seconds, regular sizes	30 0 0	"	
Yellow Pine oddments	25 0 0	"	
Kauri Pine—Planks, per ft. cube	0 3 6		0 5 0
Danzig and Stettin Oak Logs—			
Large, per ft. cube	0 2 6		0 3 6
Small " "	0 2 3		0 2 6
Wainscot Oak Logs, per ft. cube.	0 5 0		0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8		0 0 9
¾ in. do. do.	0 0 7		—
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0 0 9		0 1 0
Selected, Figury, per ft. sup. as inch	0 1 6		0 2 6
Dry Walnut, American, per ft. sup. as inch	0 0 10		0 1 0
Teak, per load	17 0 0		21 0 0
American Whitewood Planks, per ft. cube	0 4 0		—
Prepared Flooring—	Per square.		
1 in. by 7 in. yellow, planed and shot	0 13 6		0 17 6
1 in. by 7 in. yellow, planed and matched	0 14 0		0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0		1 0 0
1 in. by 7 in. white, planed and shot	0 12 0		0 14 6
1 in. by 7 in. white, planed and matched	0 12 6		0 15 0
1¼ in. by 7 in. white, planed and matched	0 15 0		0 16 6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0		0 13 6
1 in. by 7 in. do. do.	0 14 0		0 18 0
¾ in. by 7 in. white do. do.	0 10 0		0 11 6
1 in. by 7 in. do. do. do.	0 11 6		0 13 6

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.		£ s. d.
Rolled Steel Joists, ordinary sections	6 5 0	...	7 5 0
Compound Girders, ordinary sections	8 2 6	...	9 5 0
Angles, Tees and Channels, ordinary sections	7 17 6	...	8 17 0
Flitch Plates	8 5 0	...	8 15 0
Cast Iron Columns and Stanchions including ordinary patterns	7 2 6	...	8 5 0

METALS.

	Per ton, in London. £ s. d.		£ s. d.
IRON—			
Common Bars	7 5 0	...	7 15 0
Staffordshire Crown Bars, good merchant quality	7 15 0	...	8 5 0
Staffordshire "Marked Bars"	10 0 0	...	—
Mild Steel Bars	8 15 0	...	9 5 0
Hoop Iron, basis price	9 5 0	...	9 10 0
" Galvanized	17 10 0	...	—
(*And upwards, according to size and gauge.)			
Sheet Iron, Black—			
Ordinary sizes to 20 g.	9 15 0	...	—
" " 24 g.	10 15 0	...	—
" " 26 g.	12 5 0	...	—
Sheet Iron, Galvanised, flat, ordinary quality—			
Ordinary sizes—6 ft. by 2 ft. to 3 ft. to 20 g.	12 15 0	...	—
Ordinary sizes to 22 g. and 24 g.	13 5 0	...	—
" " 26 g.	14 5 0	...	—
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes to 20 g.	16 0 0	...	—
" " 22 g. and 24 g.	16 10 0	...	—
" " 26 g.	18 0 0	...	—
Galvanised Corrugated Sheets—			
Ordinary sizes 6 ft. to 8 ft. 20 g.	12 10 0	...	—
" " 22 g. and 24 g.	13 0 0	...	—
" " 26 g.	13 15 0	...	—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	11 15 0	...	—
Best Soft Steel Sheets, 22 g. & 24 g.	12 15 0	...	—
" " " 26 g.	14 0 0	...	—
Cut nails, 3 in. to 6 in.	9 0 0	...	9 10 0
(Under 3 in., usual trade extras.)			

LEAD, &c.

	Per ton, in London. £ s. d.		£ s. d.
LEAD—Sheet, English, 3lb. and up	14 10 0	...	—
Pipe in coils	15 0 0	...	—
Soil pipe	17 10 0	...	—
Compo pipe	17 10 0	...	—
ZINC—Sheet—			
Vieille Montagne ton	27 10 0	...	—
Silesian	27 5 0	...	—
COPPER—			
Strong Sheet per lb.	0 0 10	...	—
Thin "	0 0 11	...	—
Copper nails "	0 0 10	...	—
BRASS—			
Strong Sheet "	0 0 9½	...	—
Thin "	0 0 10	...	—
TIN—English Ingots "	0 1 3½	...	—
SOLDER—Plumbers' "	0 0 6½	...	—
Tinmen's "	0 0 8	...	—
Blowpipe "	0 0 9	...	—

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2¾d.	per ft. delivered.
" fourths	1¾d.	" "
21 oz. thirds	3¼d.	" "
" fourths	2¼d.	" "
26 oz. thirds	4d.	" "
" fourths	3¼d.	" "
32 oz. thirds	5d.	" "
" fourths	4¼d.	" "
Fluted Sheet, 15 oz.	3d.	" "
" 21 oz.	4d.	" "
⅛ Hartley's Rolled Plate	1¾d.	" "
⅛ " " "	2d.	" "
¼ " " "	2¼d.	" "

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 1 7
" " " in barrels	"	0 1 8
" " " in drums	"	0 1 10
Boiled " " in pipes	"	0 1 9
" " " in barrels	"	0 1 10
" " " in drums	"	0 2 0
Turpentine, in barrels	"	0 3 6
" in drums	"	0 3 8
Genuine Ground English White Lead	per ton	18 15 0
Red Lead, Dry	"	18 10 0
Best Linseed Oil Putty	per cwt.	0 6 6
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, &c., 26s. per annum. Remittances (payable to J. MORGAN) should be addressed to the Publisher of "THE BUILDER," Catherine-street, W.C.

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TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

BRENTWOOD.—For erecting workshops at High Wood School, for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief:—

Dowsing & Davis	£583 0 0	W. E. Westgate	£445 0 0
Aldridge & Son	520 0 0	W. Wakeling	420 0 0
Gardner & Hazell	496 0 0	F. W. Burtwell	388 0 0
T. Cole	496 0 0	R. Iles, Ltd., Broadway, Walham Green*	355 0 0
E. West	475 0 0		
Davey & Jones	467 0 0	J. Parren & Son	74 14 6
F. W. Jarvis	455 0 0		

BRENTWOOD.—For wood fencing and iron railings at High Wood School, for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief:—

J. Parren & Son	£570 10 0	R. Iles, Ltd.	£197 15 0
Aldridge & Son	317 0 0	F. W. Jarvis	190 0 0
T. Cole	224 19 0	Rowland Bros., Fenny Stratford*	183 0 0
W. E. Westgate	210 0 0		
M. Marshall	198 0 0		

CELBRIDGE (Ireland).—For alterations and improvements at Rathcoole Dispensary residence, for the Guardians. Mr. J. J. Inglis, C.E., architect, 59, Rathgar-road, Dublin. Quantities by architect:—

Hodges & Sons	£296 0 0	J. Kennedy	£140 0 0
T. Somers	170 0 0	J. Eacret, Naas*	139 15 0
J. Mulligan	155 0 0		
P. Shortall	150 0 0		

CLAYTON-LE-MOORS.—For 240 lineal yards o wrought-iron unclimbable fencing, with gate complete fixed, for the Urban District Council. Mr. Arthur Dodgeon, Surveyor to the Council:—

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W. J. Mullins	98 10 0	Bayliss, Jones, & Bayliss	83 2 6
Vaughan Bros.	96 15 0	Smith & Sons	81 15 0
Jones & Sons	89 18 0	Green & Sons	81 12 6
Dudley Metal Co.	89 17 6	Hayward & Sons	81 10 0
Palmer & Co.	89 0 0	Hill & Smith	80 5 0
Boulton & Paul	88 5 0	Millar & Sons	79 18 0
Hewitt Bros.	88 0 0	Raybould & Co.	78 7 6
Rubery & Co.	86 17 6	J. Elwell	76 0 0
F. Fox	86 12 6	Motley & Green Ltd.	75 5 0
Globe Tank, etc., Co.	86 10 0	J. W. Bridge,	73 0 0
Priest & Sons	86 5 0	Gratrix & Sons	66 15 0
Baxendale & Co.	85 16 0	A. Livesey, Leigh*	64 10 0

DARTFORD (Kent).—For alterations and additions at Darenth Asylum, for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief:—

Multon & Wallis	£420 0 0	Gardner & Hazell	£296 0 0
Enness Bros.	348 17 6	J. Ellingham & Sons, Dartford‡	289 0 0
A. H. Innes	330 0 0		
Wontner & Co., Ltd.	297 0 0		

‡ Accepted, subject to the sanction of the Local Government Board.

IPSWICH.—For the erection of house, shop, and works, St. Matthew's-street, Ipswich, for Mr. W. D. Coe. Mr. J. A. Scheuermann, architect, High-street, Ipswich. Quantities by Mr. S. J. Parmenter:—

Cubitt & Gott	£1,070	M. Death	£950
R. Girling	1,060	V. A. Marriott	940
C. Green	990	A. Sadler	915
H. J. Linzell	987	S. Skerritt*	890
G. Grimwood & Sons	983		

LLANELLY.—For alterations to Bridgend Inn, New Dock, Llanelly, for Mr. John Williams. Mr. J. Billet, architect and surveyor, 16, Park-street, Llanelly:—

H. Thomas & Son, Pottery-road, Llanelly* .. £407 19

LLANELLY.—For re-building the Dynover Castle Hotel, Market-street, Llanelly. Mr. J. Billet, architect and surveyor, 16, Park-street, Llanelly :—
H. Thomas & Son, Pottery-road*‡ .. £746 10
‡ Exclusive of plumbing and painting.

LLANTARNAM (Wales).—For building a house, for the executors of the late H. Lawrence. Messrs. J. H. Rennie & Co., architects, Skinner-street, Newport :—
J. Charles, Crindan, Newport £816

LONDON.—For painting, distempering, whitewashing, etc., the interior, and painting, etc., the exterior of the Guardians' Offices, 283, Tooley-street, for the Guardians of the Poor of the Parish of Bermondsey. Messrs. Newman & Newman, architects and surveyors, 31, Tooley-street, London Bridge, S.E. :—

P. McCarthy ..	£1,155 0	J. Greenwood, Ltd.	£916 0
J. A. Renwick	1,134 0	W. Reason	879 10
J. Richards ..	1,090 0	Spencer, Santo, & Co., Warwick-road, Kensington*	810 0
H. Kent	1,048 0		
J. Scott Fenn ..	989 0		
Vigor & Co.....	930 0		

LONDON. — For painting, distempering, whitewashing, etc., the interior, and painting, etc., the exterior of the infirmary, Lower-road, Rotherhithe, S.E., for the Guardians of the Poor of the Parish of Bermondsey. Messrs. Newman & Newman, architects and surveyors, 31, Tooley-street, London Bridge, S.E. :—

H. Kent.....	£2 895	W. Reason, 47, Rosebery-avenue, E.C.*	£2,292
J. A. Renwick	2,740		
Hall Bros.....	2,477		
J. Richards	2,450	Wontner & Co.....	1,987

LONDON.—For painting and cleaning works, etc., South Wharf, Trinity-street, Rotherhithe, S.E. (River Amubulance Service), for the Metropolitan Asylums Board :—

W. C. Reeder & Co.....	£161 15 0	Vigor & Co. ..	£317 10 0
		J. Hall	306 6 0
W. J. Coleman & Co.....	455 10 0	W. Gray & Co.	276 7 11
		J. J. Richards, 3, St. David's-street, Borough, S.E.*	269 0 0
A. Porter	374 0 0		
W. Durrant & Son	370 0 0		
J. Bullers	360 10 0		
Wontner & Co., Ltd.	337 0 0		

MARGATE.—For laying water-mains in Monkton, Stourmouth, and Preston, for the Corporation. Mr. A. Latham, M.Inst.C.E., 15 Cecil-square, Margate :—
C. Castle & Co., Garlinge, Westgate-on-Sea £176 18 9

MERTHYR VALE.—For erecting caretaker's house adjoining the Constitutional Club. Mr. W. Dowdeswell, architect, Treharris :—
Jones Bros., Treharris £232 12 6

NESTON (Cheshire).—For the erection of an entrance lodge and chapel at Cemetery, Raby-road. Messrs. Knowles & Russell, architects. Quantities by architects :—

A. White & Son.....	£1,877 0 0	R. T. Amery ..	£1,513 9 6
W. Fleming ..	1,715 0 0	J. Merritt	1,491 0 0
J. Taylor	1,700 0 0	J. & E. Evans, Neston, Cheshire* ..	1,479 0 0
R. Allen.....	1,565 0 0		
P. McLachlan	1,532 0 0		

POOLE.—For road and sewer works, Springfield-road and Woking-road, Parkstone. Mr. J. Elford, Borough Surveyor, Poole :—
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Tryhorn & Son, Salisbury* £323 11 0
Woking-road Drain.
Gates & Gulliver, Parkstone*..... 107 6 0

OLD KILPATRICK (Scotland).—For additions to Gavinburn School, for the School Board. Messrs. Thomson, Turnbull, & Peacock, architects, 122, Wellington-street, Glasgow. Quantities by Messrs. G. Smellie, Taylor, & Browne, 180, St. Vincent-street, Glasgow :—
Mason Work : D. Winton, Duntocher, Dumbartonshire £1,200 0 0
Joiner Work : R. Yendall, Levenford-terrace, Dumbarton 598 11 7
Slater Work : W. Latts & Son, Canal-street, Clydebank 147 13 6
Plaster Work : J. & H. Williamson, Bank-street, Clydebank 87 5 9
Plumber Work : R. Cameron, Bonaccord-place, Clydebank 165 0 0

STROOD.—For erecting a greenhouse at Strood Cemetery, for the Joint Burial Committee for Strood Intra and Strood Extra. Mr. Amos B. Acworth, architect, 114, High-street, Strood :—

G. A. Waterton	£200 0 0	Tanner Bros. ..	£125 0 0
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West Bros.....	175 0 0	Mitchell & Worsell, Halling*	98 0 0
G. West	158 0 0		
J. S. Hitch	156 10 0		

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Norman	1,228 0 0		
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Leighfield ..	1,188 0 0	S. Chambers	1,106 5 0
J. Williams .	1,174 17 6		

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J. H. Vickers	3,577 6 2	H. Williams	3,222 11 4
F. Newton ..	3,571 0 0	W. G. Wilmot	3,214 14 7
J. J. Raymond & Son	3,524 18 0	R. M. Parkinson, 93, Lincoln-road, Peterborough* ..	3,200 0 0
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SANITARY INSTITUTE EXAMS.—Preparation for the Inspectors' Examination by a Correspondence Course, needing no text-books or Acts, by C. H. CLARKE, Assoc.San.Inst.; Fellow Inst. San. Engineers; Honours Medallist in Hygiene, etc.; Author of Clarke's "Aids":—Notes on Sanitary Law, 1s. 6d.; Examination Questions on San. Law, 6d.; Calculation of Cubic Space, 1s.; Trade Nuisances, 6d.; Practical Drain Inspection, 6d.—Prospectus and "Aids" from 120, Thoroldroad, Ilford, E.

PRELIMINARY R.I.B.A. EXAMINATION.
PERSONAL or CORRESPONDENCE TUITION. Only three failures during last five years; ninety-four per cent. passes. All necessary books lent.
Mr. FISHER { 71, Wiltshire-road, Brixton, S.W.

YOUNG ARCHITECT, with small country practice and public appointments, desires to enter into a PARTNERSHIP in a busy district. Would finance a beginner with good prospects, or would take responsibility off a partner desiring leisure.—Box 367, Office of "The Builder."

GLAZED BRICK.—AGENCIES WANTED for London, Birmingham, and Cardiff. Give full particulars of connexion etc.—Box 352, Office of "The Builder."

STRUCTURAL IRON and STEELWORK by CORRESPONDENCE.
A COURSE of LECTURES on this important subject, adaptable to architects, civil engineers, and draughtsman, now being ISSUED. Practicable and everyday examples. Terms, eight shillings the course. Write for particulars.—ENGINEERING BUREAU, 40, Delamere-road, Flixton, Manchester. Designs, quantities, etc., of steelwork prepared for architects, etc.

BUILDERS' QUANTITIES. — Correspondence Classes (private tuition) for students, architects' and surveyors' assistants, builders' assistants, foremen, and clerks of works. A course of twenty-five LECTURES, showing the London method of measuring builder's work for all trades, by an experienced Surveyor.—Full particulars on application, Box 107, Office of "The Builder."

QUANTITY TAKING and BUILDERS' ESTIMATING.—An experienced London Surveyor is open to give a course of LESSONS by CORRESPONDENCE in above subjects, same being specially prepared for builders' clerks, foremen, leading hands, and all connected with the building trade.—For terms, full particulars, and references write to CLASSES, Box 1, Willing's, 162, Piccadilly, London, W.

PRACTICAL SANITARY SCIENCE.—A COURSE of eight LECTURES commences on FRIDAY, October 7th, for candidates for Examinations of the Sanitary Institute, Surveyors' Institute, and Institute of Sanitary Engineers. Fee for course, one guinea.—Full particulars and list of subjects from JOHN LAWRANCE, Junr., Mem. San. Inst., 112, Shirland-road, W.

PRACTICE for SALE. Steady, established ARCHITECT and SURVEYOR. Country town and neighbourhood. Price less than one year's purchase. Give few months' introduction. Would make London branch.—Box 1904, care of Bates, Hendy, & Co., Valpy-street, Reading.

COMPANION WANTED by STUDENT R.I.B.A. (final R.I.B.A. June, 1904) for two weeks' sketching tour on Continent or parts in England.—Experience, etc., Box 350, Office of "The Builder."

INTERNATIONAL GAS EXHIBITION, EARL'S COURT, LONDON, E.C., 1904.—AWARDS to an amount not exceeding in the aggregate 100*l.*, are offered to artists and handicraftsmen by the Institution of Gas Engineers for new and artistic GAS FITMENTS, to be shown at this exhibition, which will be opened on NOVEMBER 19.—Particulars free on application to the SECRETARY OF THE ADVISORY COMMITTEE, Gas Works Waddon, Croydon.

WANTED to HIRE or PURCHASE.—Two Light PILE ENGINES, with Monkey, from 2 cwt. to 5 cwt.—BINLEY, 41, Plevna-road, South Tottenham.

FOR SALE.—RAILWAY SLEEPERS and CROSSING TIMBERS. Large quantity good second-hand Railway Metals, flat bottoms; fifty tons, 56 lbs. to yard, Galvanised Sheets, 7 ft., 8 ft., 9 ft. Good.—A. BINLEY, 41, Plevna-road, South Tottenham.

BATTERSEA POLYTECHNIC,
LONDON, S.W.
The Governing Body REQUIRE the services of an ASSISTANT-INSTRUCTOR in MANUAL TRAINING and CARPENTRY and JOINERY.
Commencing salary 100*l.* per annum, rising by 5*l.* to 120*l.*
For particulars send stamped addressed envelope to the SECRETARY. Early application desired.

ACTON URBAN DISTRICT EDUCATION COMMITTEE.
The Committee invite APPLICATIONS for the APPOINTMENT of QUANTITY SURVEYOR, the remuneration being at the rate of one per cent. on the amount of the accepted Tender; this remuneration to cover travelling expenses.
The immediate work to be done is the preparation of bills of quantities for the erection of the Southfield-road Council School (estimated cost 20,000*l.*).
Applications to be delivered at the Education Offices, Priory Schools, Acton, W., and endorsed "Quantity Surveyor," on or before WEDNESDAY, 21st day of SEPTEMBER, 1904.
Canvassing the members of the Committee will be considered a disqualification.
F. A. EVERITT,
Secretary to the Committee.
Education Offices,
Priory Schools,
Acton.
6th September, 1904.

WANTED by the Government of Perak, Federated Malay States, a CHIEF DRAUGHTSMAN in the Survey Department, on three years' agreement. Salary, 360*l.* a year. Passages provided.
The person selected will be required to check the work of a subordinate staff in all details, and must himself be a fully-qualified survey draughtsman, with a thorough knowledge of plotting details, computing areas, and trigonometrical calculations.
Unmarried candidate about 30 years of age preferred.
Apply by letter, stating age and past experience, and forwarding copies of testimonials, to
THE EASTERN DEPARTMENT,
Colonial Office,
Downing-street, S.W.,
on or before 15th SEPTEMBER, 1904.

CITY of CARLISLE.
GENERAL ASSISTANT.
The Corporation REQUIRE the services of a competent GENERAL ASSISTANT. Preference will be given to candidates possessing a good knowledge of architectural design and building quantities.
Salary 90*l.* per annum.
Applications in own handwriting, stating age, experience, and qualifications, accompanied by not more than three recent testimonials, to be sent to the undersigned not later than THURSDAY, SEPTEMBER 15th, endorsed "General Assistant."
Canvassing members of the Council either directly or indirectly is prohibited, and any infringement of this condition will immediately disqualify the candidate.
HENRY C. MARKS, Assoc.M.Inst.C.E.,
City Engineer and Surveyor.
36, Fisher-street,
Carlisle.
September 3th, 1904.

TUNNEL FOREMAN REQUIRED for service on the Ceylon Government Railways.
Candidates should have had practical experience of working rock drills with compressed air, driving headings in hard rock, timbering headings and tunnels, lining tunnels, and charging and firing shots in hard and soft rock.
Salary at the rate of 360*l.* per annum, together with such sums for overtime, Sunday pay, and night expenses when he has to sleep in another district than that to which he is appointed, as may be in accordance with the regulation of the Railway service.
The salary will be payable in rupees at the current rate of exchange.
Engagement will be for such period as may be occupied in the construction of the tunnels.
Free unfurnished quarters or allowance for rent will be provided.
Free second-class passage out and home again on satisfactory termination of engagement.
The selected candidate will be required to sign an agreement before being appointed. Strict medical examination.
Applications by letter (no special form required), stating age, whether married or single, and, if former, number of children (if any), and giving full particulars of experience, accompanied by copies of testimonials (not originals) with names and addresses of references of whom enquiry can be made as to capabilities and character, will be received by the CROWN AGENTS FOR THE COLONIES, Whitehall-gardens, London, S.W., up to 17th SEPTEMBER.
The following reference and the name of this paper should be quoted on the left-hand top corner of letter of application—M. 2003.

WOOD GREEN DISTRICT COUNCIL.
APPOINTMENT OF A BUILDING INSPECTOR.
A BUILDING INSPECTOR is REQUIRED in the Office of the Wood Green Urban District Council.
Written applications, stating age, previous training and experience, and accompanied by copies of testimonials of recent date, addressed to the undersigned, to be delivered at the Town Hall, Wood Green, N., not later than FIVE p.m. on WEDNESDAY, the 21st inst.
The salary to commence at the rate of three guineas per week.
(Signed) CHAS. J. GUNYON,
Surveyor.
Wood Green, N.,
September 7th, 1904.

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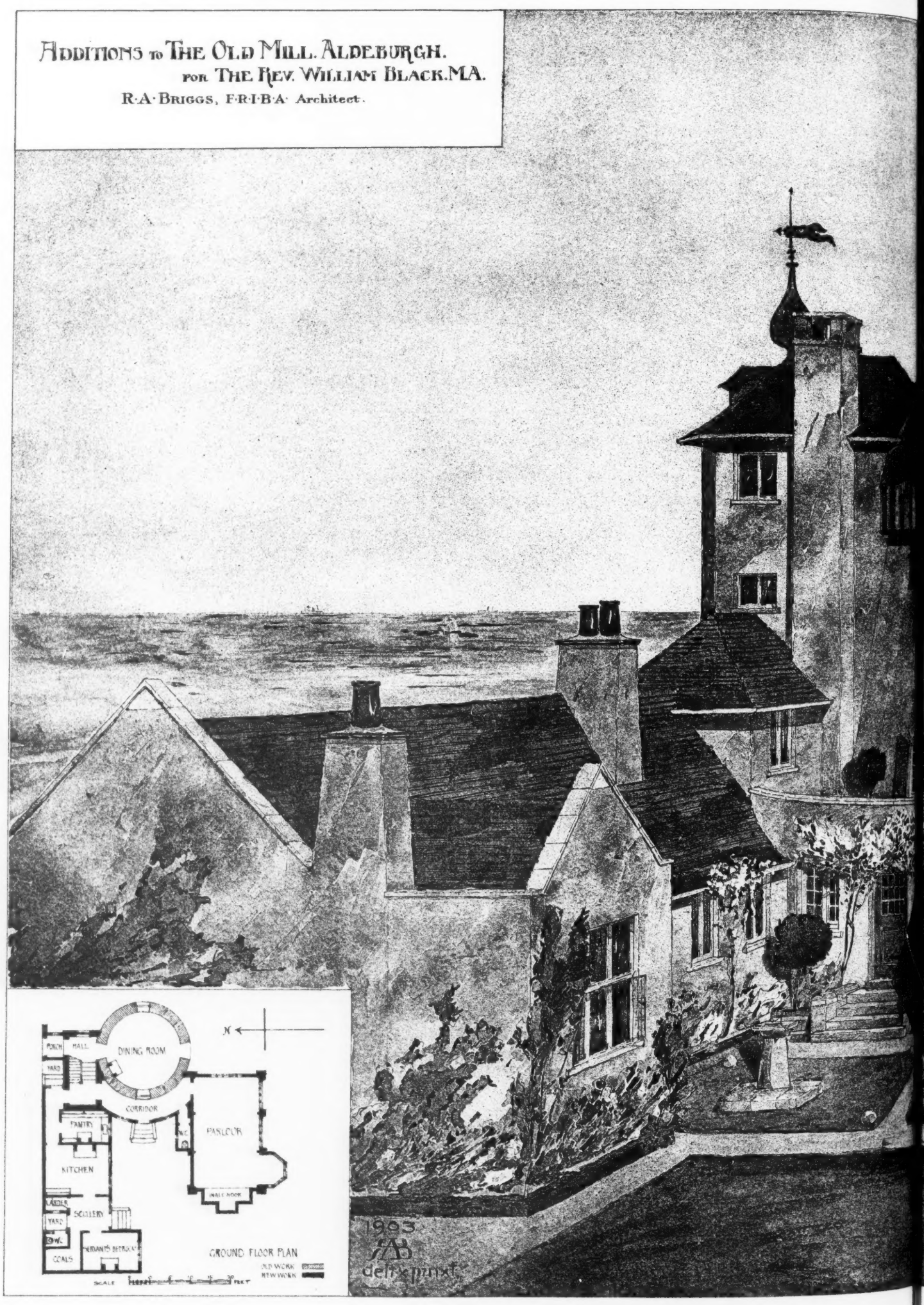
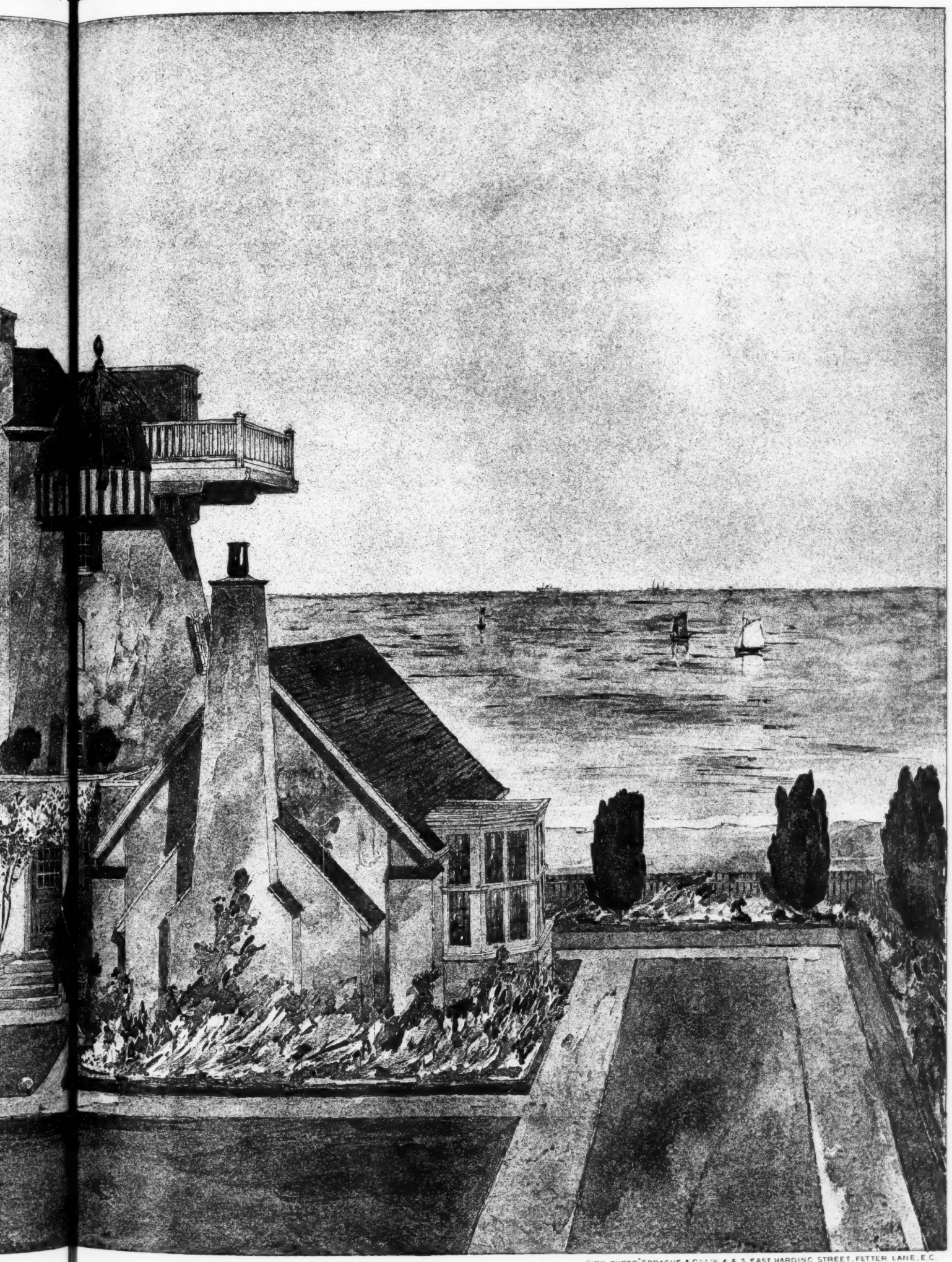
Additions to The Old Mill. Aldeburgh.

for The Rev. William Black. M.A.

R. A. Briggs, F.R.I.B.A. Architect.





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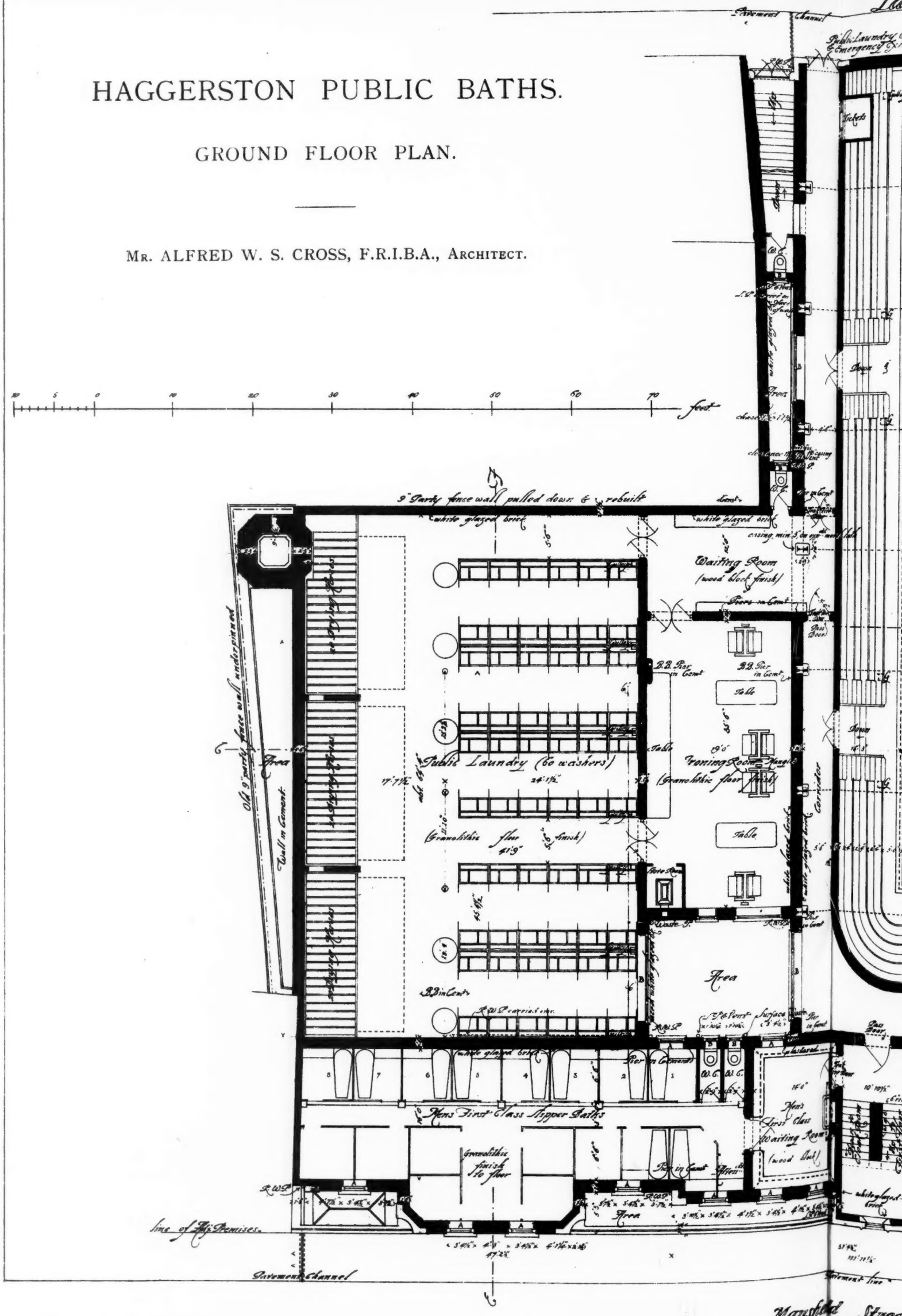
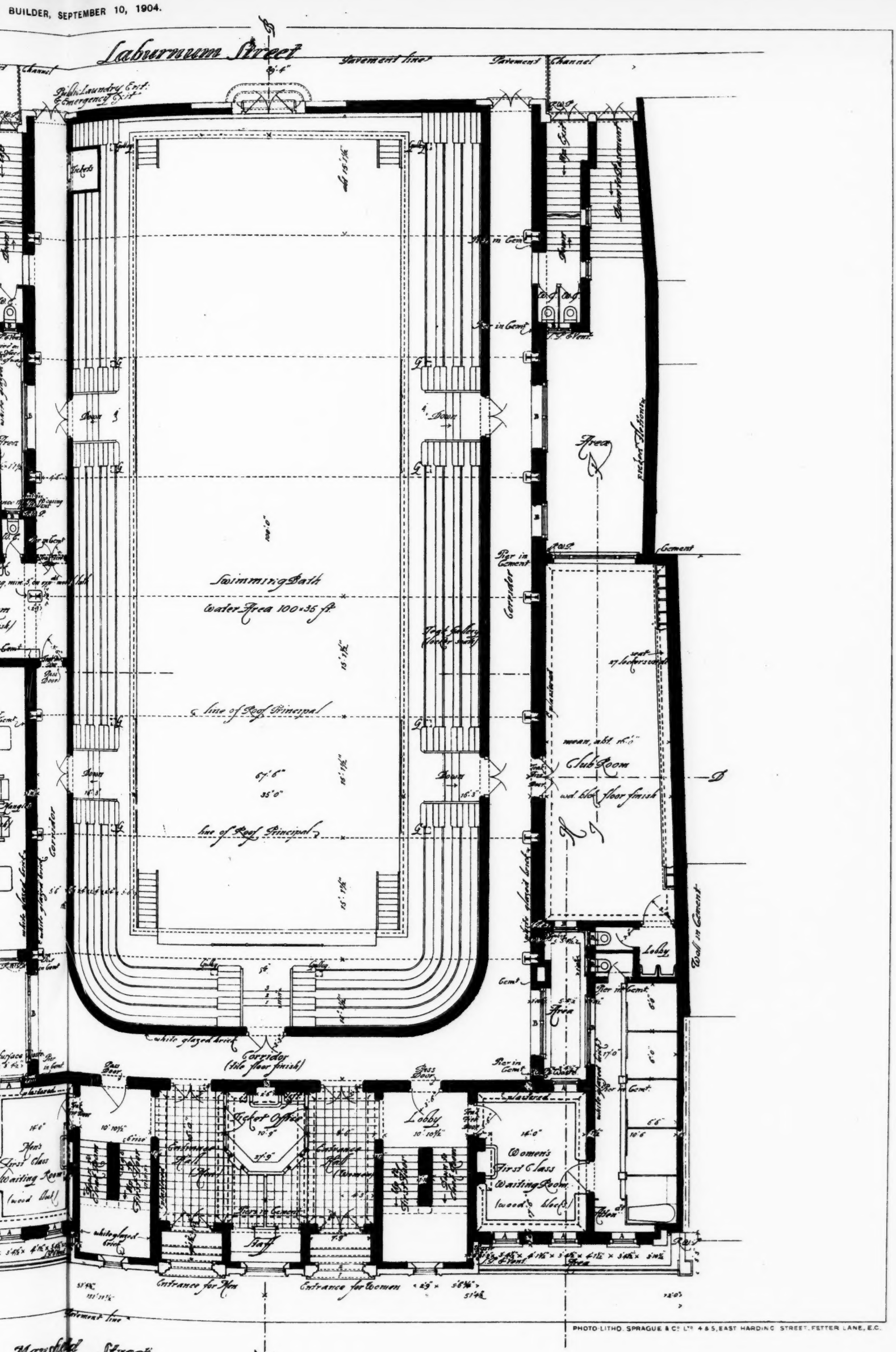
HAGGERSTON PUBLIC BATHS.

GROUND FLOOR PLAN.

MR. ALFRED W. S. CROSS, F.R.I.B.A., ARCHITECT.





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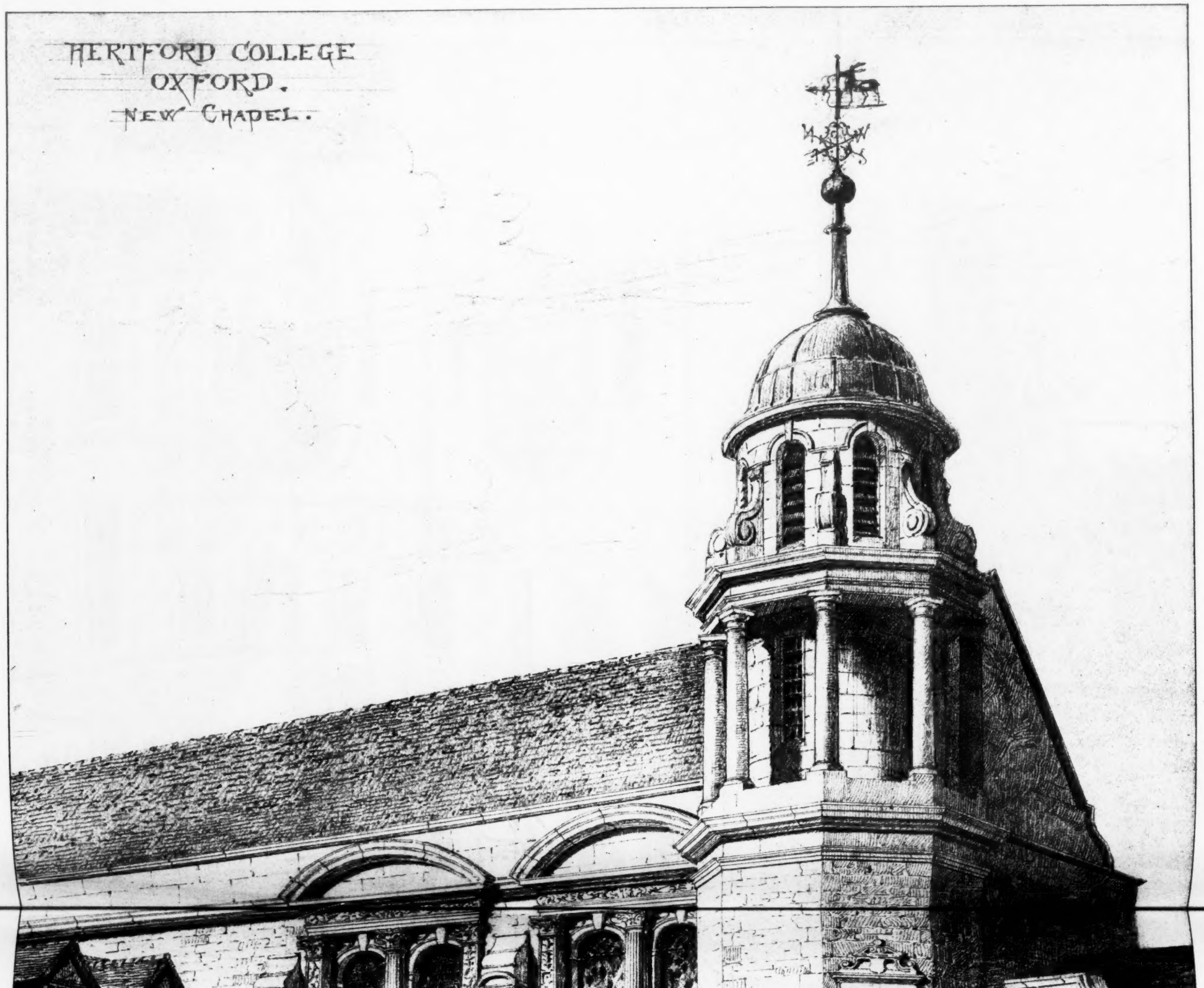
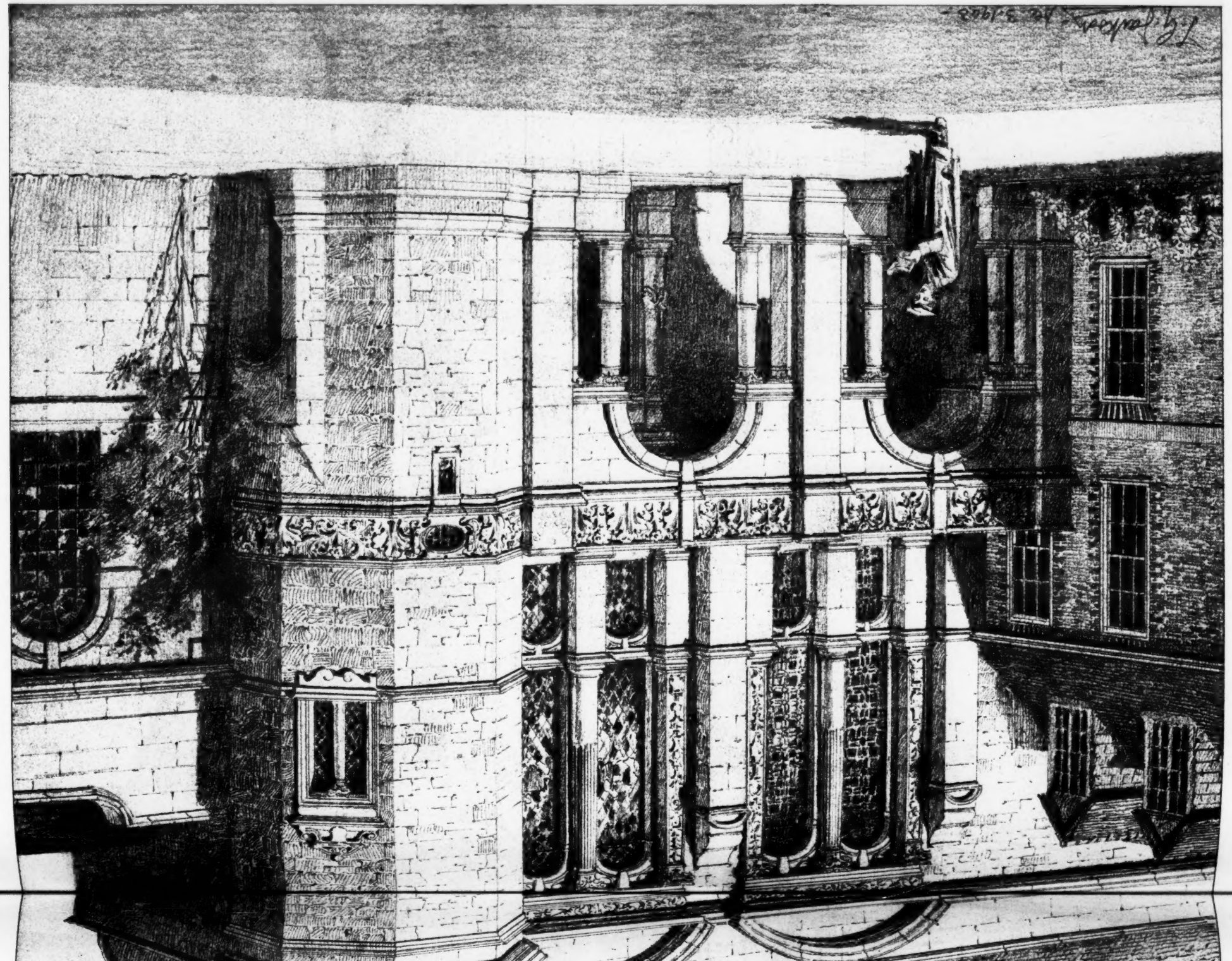
HAGGERSTON PUBLIC BATHS.—Mr. Alfred W. S. Cross, F.R.I.B.A., Architect.

HERTFORD COLLEGE
OXFORD.
NEW CHAPEL.





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